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Hail Insurance on Fruit Crops

By R. A. Van Meter

Massachusetts Agricultural College

WHERE there are measurable risks, there is a field for insurance. Hail insurance on fruit crops is now available in most fruit sections. It is relatively new, but there has been a great increase since the war in the volume of hail insurance written for fruit growers, particularly on apples.

The bulk of the fruit insurance has been written in the East. New York, Pennsylvania, Maryland and, until the last season, the Shenandoah Valley of the two Virginias, have been leaders. In the Middle West, the leading states have been Missouri, Illinois and Kansas, with a good many policies in Oklahoma, Wisconsin and Ohio. Because of heavy losses in the Shenandoah Valley in 1924 and 1925, most of the companies withdrew from that section in 1926. The feeling seems to be general that a rate high enough to take care of losses in the valley could not be obtained. The cost of the insurance would be too high to appeal to fruit growers.

No Insurance for Full Value

No insurance company attempts to insure a fruit crop for its full value, nor does it attempt to determine the actual dollars and cents damage done by a hailstorm. A system has been devised by someone, however, under which evaluations can be made and losses adjusted with at least an approach to accuracy. Instead of attempting to insure the crop for its full value, insurance is written on an arbitrary amount per acre, which presumably is somewhat less than the value of the crop but covers the cost of pruning, spraying and otherwise caring for the trees. The limit placed by insurance companies is \$300 per acre in most sections, but a \$200 limit has been set in some districts. That is, a fruit grower may insure his crop, usually early in the season, for any amount he may find desirable up to the limit beyond which insurance companies will not go. It is common for fruit growers to take out the maximum of insurance, for \$300 per acre is little enough.

Hail insurance is paid for on a percentage basis, usually four or five per cent of the amount of the insurance, but the rates vary with the frequency with which hailstorms are known to occur in different districts. If a fruit grower insured 50 acres at \$300 per acre, his total insurance would be \$15,000, and at five per cent his total premium would be \$750. The rate usually is the same whether the policy is written in June or September.

Adjustment Made on Percentage Basis

Adjustment is also on a percentage basis. After a hailstorm, it is impossible to determine the actual loss, but it is possible for an experienced man to place the loss with a fair degree of accuracy at some percentage of the total value of the crop. A total loss in the above instance would call for the payment of \$15,000, and a 50 per cent loss for half that amount.

Hail insurance is written for one season only and not, like fire insurance, for a period of years. It is difficult to see how the method of writing hail insurance could be greatly im-

proved, but many fruit growers feel that the service would be better if they could insure a good crop for more than \$300 per acre.

Most of the hail insurance on farm crops in general has been written by the joint stock fire insurance companies. The following companies have been leaders: Hartford, Home, St. Paul Fire and Marine, Great American, Automobile, Globe and Rutgers, Twin City, North American, Springfield and Continental. Hail insurance is a sideline with all of these companies. A number of mutuals, however, are active in the grain belt and in tobacco districts. In the Dakotas, Montana and Nebraska, the state governments offer hail insurance on farm

crops. Mutual insurance for fruit growers has been discussed in many eastern sections, but the business is still too new and uncertain to be very tempting to organizations without heavy financial backing.

Hail Insurance Began in 1880

The first recorded hail insurance on farm crops was written in 1880 by a small co-operative organization of tobacco growers in Connecticut. The idea soon spread to the grain belt, and hail insurance has reached its greatest development there. In 1919, it involved premiums in the neighborhood of \$25,000,000, according to V. N. Valgren of the United States Bureau of Agricultural Economics. Most of

the hail insurance is still written on grain crops. Fruit insurance is new, and probably less than half the 64 companies now writing hail insurance have ever insured fruits.

Hail insurance on fruit crops was not written in any great amount until about 1920. From 1920 to 1925, there was a consistent increase in fruit insurance, particularly on apples. But some of the experiences with fruits have been disastrous for the underwriters. The retrenchment of some companies and the withdrawal of others from certain sections reduced the amount of fruit insurance written in 1925. In 1926, there was thought to be once more a substantial increase throughout the eastern states, although detailed reports are not yet available to show accurately the amount of business done and its distribution.

Hail Belts Present Difficult Problem

One of the most serious obstacles to the rapid development of fruit insurance, and a circumstance which has tended to curtail the service offered by underwriters in this field, is the existence in many fruit sections of hail belts where damage is frequent and severe. It will take many years of experience to locate all these areas and adjust the rates to an equitable basis, but fruit growers so unfortunately located have known it, and too often they have been among the best customers for hail insurance. This tends to keep rates up by keeping losses at a high figure.

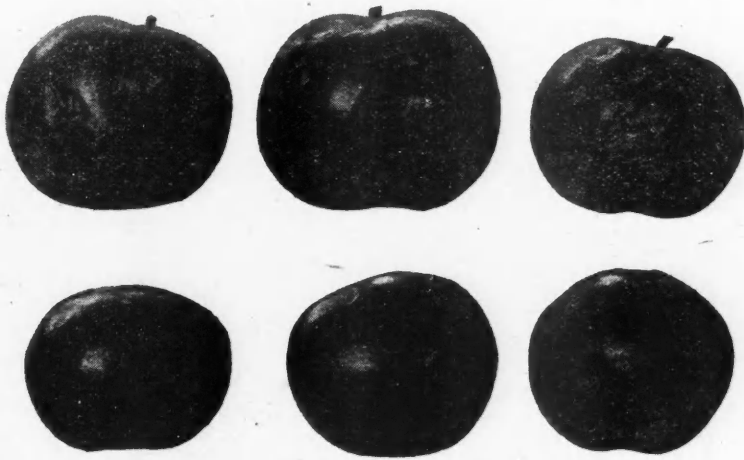
That is where hail insurance departs widely from life insurance and fire insurance. If 100,000 barns were insured against fire, the percentage burned each year could be predicted with some accuracy from the data accumulated through many years of experience. In hail insurance, this data is only slowly becoming available as experience increases, but it is apparent that losses vary tremendously from year to year. Furthermore, losses by fire would be spread more or less uniformly over the area, while hailstorms occur much more frequently in some places than in others. That is why hail insurance rates vary from three per cent to 17 per cent in different sections of a single western state.

The feeling is general, however, that in most sections equitable rates can be developed. To date, the fruit growers in some sections have had a little the best of it, according to the official reports of companies writing hail insurance, who report loss ratios too high to cover costs and predict advances in rates for those districts.

Hail Insurance Organized by Sections

Most of the insurance companies have organized their business by territories, known as the East, West, South, Pacific, and Canadian. Rates and the maximum amounts of insurance allowed per acre are standardized, at least in the eastern, western and southern territories, by conferences, to which most of the companies adhere. The limit of insurance allowed on an acre of a given crop is uniform. Three hundred dollars is the usual limit for apples, apricots, cherries, peaches, pears, plums,

(Concluded on page 27)



Top.—Hail damaged McIntosh apples. Fruit that is this badly damaged has little or no market value. Bottom.—Baldwins dented and slightly cut by hail. Such marks are used by buyers to depress the price

Editorial Contents

Hail Insurance on Fruit Crops, by R. A. Van Meter.....	3
Rambles of a Horticulturist, by C. E. Durst.....	4
Handling the Orchard Soil—Part I, Effect of Cultural Methods on the Soil Itself, by J. H. Gourley.....	5
The Pollination Problem in Fruit Growing, by A. B. Stout....	7
Fertilizing Apples in the Northwest, by C. C. Vincent.....	8
Topworking Unprofitable Sweet Cherry Trees, by James A. Neilson	9
Pollination Problems in Wenatchee Valley, by A. R. Chase...	10
Summary of Fruit Prospects, by C. E. Durst.....	12
Control of Small Fruit Diseases, by A. S. Colby.....	14
Tree Growth and Fruit Production, by Joseph Oskamp.....	18
EDITORIAL	6
Retain the Federal Farm Board—A Commendable Stand—Self Interest and Co-operation Will Not Mix—Why Was He Appointed?	

DEPARTMENTS

The Editor's Mail Box.....	16	Chats with Fruit Grower's Wife.....	30
Markets and Marketing.....	20	Patterns.....	32
With the Co-ops.....	22	Beekeeping for Fruit Growers.....	33
The Orchard Home Department.....	23	Engineering for the Fruit Grower.....	35
		Profitable Poultry	38

Rambles of a Horticulturist

By C. E. Durst

TWO VERY interesting fruit sections in California which I visited last summer are the Santa Clara Valley and the Watsonville district. Both are located a short distance south of San Francisco. I spent about two days in the Santa Clara Valley. E. J. Shaw, field manager of the California Prune and Apricot Growers' Association, kindly spent the greater part of one day with me. Howard Houston of the California Spray-Chemical Company generously accompanied me on the second day, and he also visited the Watsonville section with me.

The Santa Clara Valley is located in a pocket of the coast range. It extends from northwest to southeast and is fairly narrow in its upper or south portion and widens out toward the lower or north end. At the north end, the valley opens out into San Francisco Bay. The valley is drained toward the north by several small streams. The chief part of the valley is located in Santa Clara county. However, parts of several surrounding valleys are included.

Prunes Are Chief Crop

This valley grows a great variety of fruits. Among these are prunes, fresh plums, apricots, peaches, pears, cherries, apples and a few others. By far the most important crop is prunes. There are 45,000 acres of plums grown for prunes in the valley, and about 40,000 acres are in Santa Clara county alone. The valley grows about one-third of the prunes of California, and until recently it produced about half of them. Since California grows about 90 per cent of the prunes of the United States, the importance of the production in this valley is apparent. The California production in 1925 was 290,000,000 pounds, while that of the Pacific Northwest was 26,000,000 pounds. About two and one-half pounds of fresh plums are required for one pound of the dried product. The French variety (prune d'Agen) is used almost exclusively, although a few Imperials are also grown.

The valley is quite flat in its main portion. Along the borders, especially in the upper part, the land becomes more or less undulating, due to erosion from the mountains. In the main part of the valley, fruits are grown almost entirely. Here, all orchards are irrigated. The trees present a beautiful appearance with their straight rows extending in every direction, with their trunks white-washed in most cases, and with high hills or mountains in the background. There are considerable orchard plantings in the foothills, some of them being of rather high elevation. Many of these are not irrigated. With good care, some of these are said to do fairly well, but when neglected the trees quickly deteriorate, due to the small rainfall.

The soil of the Santa Clara Valley is of mountainous origin. In common with such soils, it is deep, loose, easily worked and quite rich. The soil of the valley floor is mostly of a dark brown color and is quite uniform in type, but as the foothills are reached, the color and type vary, due to wash from the mountains.

The rainfall is about five or six inches a year in the valley. In the foothills there is somewhat more. Just over the primary coast range to

the west, the rainfall is about 80 inches a year, I was told. This circumstance shows the influence of mountains on rainfall.

Water Table Gradually Being Lowered

In view of the small rainfall, irrigation is necessary in the valley. The water is obtained entirely from deep wells, the streams being dry in the summer time. Formerly, the water could be obtained from wells 50 to 100 feet deep, but because of the tremendous quantities of water used, the

water table in the soil has gradually been lowered. Engineers state that the water table is being lowered 10 feet a year. It has therefore been necessary for growers to deepen their wells every little while. Many wells are now 200 to 300 feet deep, and some are as deep as 400 and 500 feet. Many of the wells are 12 to 24 inches in diameter, and practically all are equipped with electrically driven turbine pumps.

Many growers are worried about the future supply of water. The rainfall has been below normal for several years, and many growers have been hoping that the return of normal rainfall would raise the water table. Perhaps the heavy rains of the winter have helped in this direction. The district has voted twice on projects for building dams to impound the water in the upper part of the valley, but in both cases the projects have been voted down. The coast range is not particularly high in this vicinity, and the water shed from which water could be impounded is small. However, engineers claim that there are a couple of sites at which dams could be constructed to hold back the waters from winter rains.

Water Supply Carefully Handled

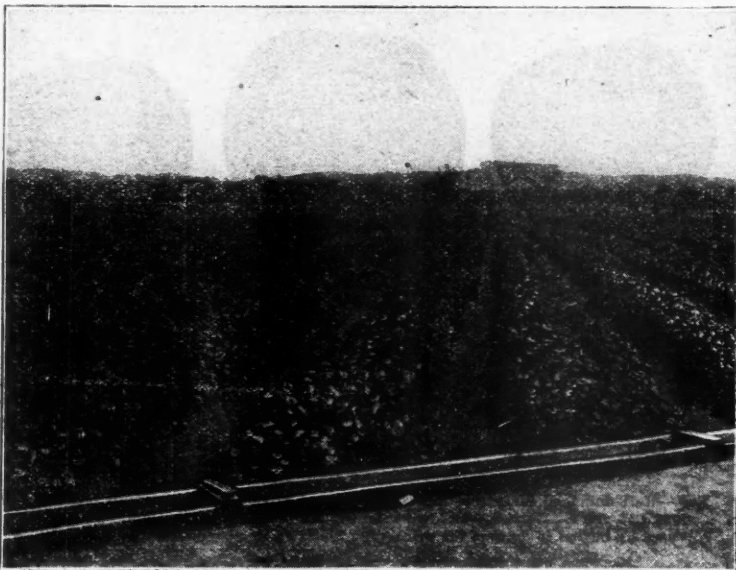
Due to the water shortage, growers take good care of the supply. Much of it is distributed in underground tile, the joints of which are sealed. In some cases, surface ditches are employed. The water is distributed in most cases by the flood system, usually in small checks. The flatness of the land is ideal for this method. Ridges are thrown up around each tree or group of trees. The water is then turned in until a sufficient amount has accumulated. Then the ridge is closed, and the water is diverted to another check. By this means, a very uniform distribution is secured. Irrigation begins in February and continues through the growing season. In the case of prunes, no water is applied near ripening time because of the danger of cracking the fruits. Some growers irrigate for the good of the trees after picking the crop.

The orchards in the Santa Clara Valley are nearly all clean cultivated during the growing season. A few are allowed to grow up in weeds or grass. No doubt, the clean cultivation practiced is very destructive to nitrogen and organic matter. However, in order to replenish these, burr clover is often grown in the fall and winter of the year. Cowpeas are used extensively as fall and winter cover crops; these are said to grow well all winter without being killed by the light frosts that occur. Very little commercial fertilizer is used in the valley.

In a place like the Santa Clara Valley
(Continued on page 25)



A clean cultivated pear orchard in the Santa Clara Valley



Strawberries in double matted rows at Watsonville



Irrigating pears by the check tree system in the orchards of the A. Block Fruit Company



Carrol Rodgers and his orchard of Newtown Pippins

Handling the Orchard Soil

Part I—Effect of Cultural Methods on the Soil Itself

By J. H. Gourley

Ohio Agricultural Experiment Station

WHETHER we think of the soil or the variety as the most fundamental consideration in horticulture, all will agree that the handling or culture of the soil is of primary importance. Both fruit growers and the agencies of research have devoted much effort to determine the



An excellent cover crop of alfalfa growing in an apple orchard at Salem, Ohio

orchard practice that will give optimum growing conditions to the end that the trees would not suffer from a lack of moisture and plant food materials at any time during their development. Experiences have varied, as might be expected, and the conclusions from the different sources have not always been the same. Furthermore, new information is brought to light from time to time, and some discrepancies are now understood that formerly caused confusion.

A student of soils would view the problem from a somewhat different angle than the horticulturist, that is, he would lay emphasis at different points, but it is from the latter's viewpoint that this article will mostly deal.

A Soil for Fruit

It sounds trite to say that, by and large, the vigorous, productive orchards are on soils that are well-drained, well-aerated and moderately rich, that is, those that are either naturally fertile or are made so by artificial means. Have we not seen through the years that the poor, impoverished soils support a stunted, less productive, more often alternate bearing orchard than the fertile ones? So it becomes a problem of either laying out a program of procedure with the one or the other general type of soil, for orchards will continue to be grown on both. Not only do soils vary in different sections, but they may vary considerably in the same orchard; particularly is this true in the East.

The depth of the soil, that is, the surface soil, is of greater consequence than is often appreciated. One needs to visit the deep loess or the soils in parts of the West to get a comparison with our soils that average from seven to nine inches in depth. The large root system that develops in the former type of soil will support a proportionately more vigorous top, other conditions being favorable.

It is a question whether we fully appreciate the importance of proper soil drainage. A contour of the surface favorable for drainage does not necessarily prove that the soil itself is properly drained; in fact, this is a common source of error. For instance, there is an occasional loss of apple trees from what is diagnosed as root rot. The trees grow normally for several years, then the foliage turns yellowish and within a year or two the tree is likely to be dead. Such varieties as Stayman Winesap, Jona-

that a cupful of soil contains more bacteria, algae and protozoa than the population of the United States, which is an impressive way of saying that it is teeming with life. Also the chemical actions and reactions of the soil might be expressed in an equally graphic way. Therefore, the difference between cultivation and mulching, or between mulch and sod land, will be marked on these soil organisms and soil reactions.

Soil Temperature

The exact significance of a difference of a few degrees in temperature between two soils cannot be stated, but it seems pretty well established that, when the soil is cold, bacterial action is greatly reduced, and also that violent fluctuations during the winter and early spring may be injurious to the tree roots. Observations have been made several times to determine the soil temperature under different orchard treatments. They are in substantial agreement, although recorded at widely different points. In the main, it can be said that a bare soil, or one that is practically so, will

respond more quickly to the air temperature and will absorb the sun's rays more rapidly and radiate its heat more quickly, than one which has a covering on it. So, a bare soil is colder in winter and warmer in summer, and it fluctuates more throughout the season than either sod land or mulched soil. A mulched soil is, conversely, warmer in winter and cooler in summer, and is more uniform in temperature than the tilled one. Sod land usually is intermediate between these two but resembles more closely the mulched land. But this matter of temperature can hardly be placed in a primary position as regards tree response.

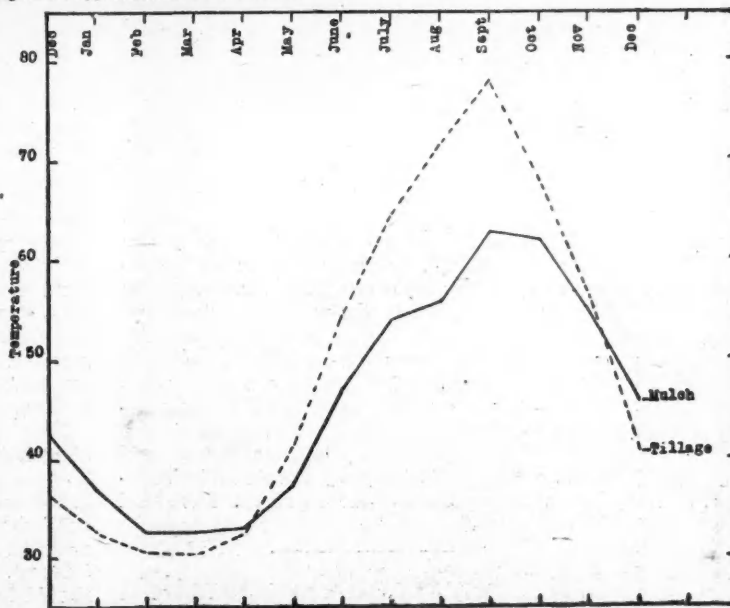
Soil Moisture

Unlike the matter of temperature, the available supply of moisture is of the greatest importance to fruit trees during their active period of growth and fruit production. Either an oversupply or a serious drought will seriously affect both trees and crop. Many an orchard, or even an entire section, has failed to be profitable because of one or the other of these conditions. We asked a grower in Washington last summer what was the most important work on his ranch, and he replied at once that he considered the irrigation labor the most important on the place. This seemed to be worked out satisfactorily in the irrigated sections, but in the East we are largely dependent upon seasonal rainfall and cultural practices that will conserve the supply. Little use has been made of irrigation for orchards, so far as we are aware.

But in this connection we are concerned with the effect of grass land, tillage and mulch upon the retention of the soil moisture. Here, as in other soil problems, the data do not always agree; differences of opinion have arisen, as well as some common misconceptions.

It is frequently stated that orchards standing in sod land are inferior because the grass robs the trees of moisture, and the yellowish and often stunted appearance is due to this cause. True, in some sections, soil moisture is the limiting factor, particularly in certain seasons, but in many others, these symptoms of low vitality are due to lack of nitrogen rather than moisture, as will be pointed out later. However, the general practice of cultivating the land during the forepart of the season to destroy the plant growth that robs the soil of moisture, and the mulching of the soil to maintain a more uniform moisture content, are both well supported by experimental data. In the writer's experience, it is common to find that the soil beneath or adjacent to trees standing in sod shows a percentage of moisture

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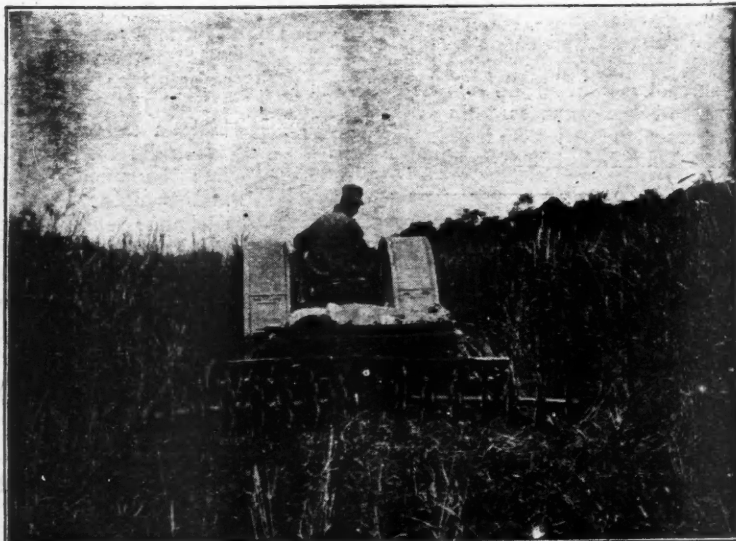


This chart shows the comparative temperatures at an eight-inch depth of soil in a mulched and a cultivated orchard from December 1, 1925, to December 1, 1926. Readings were taken once each day

than and Rome Beauty seem to be particularly susceptible to the trouble, while we have seen only one case of Delicious showing the same symptoms. While the roots decay, the primary cause of the trouble does not seem clear, but we have been led to think that it is a lack of adequate drainage at some critical period, possibly a short time each season, or a combination of improper drainage and cold. Some cases have been observed on sandy knolls and in orchards that were tile-drained, but the fact that it occurs more or less in pockets or depressions, as a rule, leads one to suspect the excess water and its attendant results.

How is the Soil Affected by Treatments

Before considering the effects of various soil treatments upon the trees themselves, we will first note how the soil is affected, for we must look there for an interpretation of certain of the trees' responses. Few people think of the soil as an inert mass of material, yet no one understands fully the biology of the soil. Someone has said



Disking a crop of rye into the soil

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Retain the Federal Farm Board

THE NATIONAL GRANGE is taking a most commendable step in opposing the movement on foot at Washington for transferring to the Treasury Department the functions of the Federal Farm Loan Board. The federal farm loans have been a great help to agriculture and have been the means of liberating great numbers of farmers from the activities of commission-seeking money lenders.

The administration of the farm loan activities has been in the hands of the Federal Farm Loan Board, and the board has done a remarkable piece of work in a very short time in getting the proposition so soundly on its feet and in such smooth working order. No system that is working as well as this one is should be changed.

Another good reason for leaving the federal farm loans in the care of the Federal Farm Loan Board is that if the matter were placed under the authority of the Treasury Department, it would fall under the jurisdiction of Andrew Mellon. Andrew's attitude toward agriculture suggests very strongly that the federal farm loan system wouldn't amount to much for the farmers if he gained control of it.

We suggest that readers register their emphatic disapproval of this proposed transfer with their senators and representatives. Letters and telegrams sent by growers to their congressmen will help to keep the Federal Farm Loan Board in power.

A Commendable Stand

MARTIN L. DAVEY, congressman from Ohio, is one of the many men in public life who is big enough to be able to change his mind when occasion justifies. He voted twice against the farm relief bill in previous sessions of Congress. He comes from a district that is largely industrial and which is opposed to farm relief. In fact, he received, according to his own statement, many letters from his constituents opposing farm relief and none favoring it. Notwithstanding these conditions, he voted for the farm relief bill in the session of Congress re-

cently closed, and he vigorously supported the measure in an address before the House of Representatives. He stated in this address that he believed he owed a greater allegiance to the country as a whole than to the narrow confines of one congressional district.

One part of his speech deserves particular consideration. It is as pertinent now as it was at the time the speech was given. The statement is as follows:

"It is said that this bill is a 'price-fixing' measure. Well, what of it? The most gigantic 'price-fixing' measure that was ever given the dignity of law is the American tariff, which substantially fixes the domestic price at the world price plus the tariff rates. Of course, it is all right to provide a 'price-fixing' measure for industry, but the beneficiaries of the tariff 'price-fixing' law condemn it as economically unsound to give the farmers a 'price-fixing' measure of protection. The next most gigantic 'price-fixing' measure ever enacted into law is the Esch-Cummins bill, which substantially guarantees rates that will yield a fixed rate on the railroad investment. That very law fixes the price of transportation for the farmers' produce and for the service that all the American people must buy from the railroads. 'Price fixing' is all right for big industrial enterprises, but all wrong for unprotected farmers.

"Price fixing" has become more or less of an accepted practice in American business, and no one seems to think it is economically unsound and dangerous. Why, even organized labor has had the benefits of 'price fixing' in connection with the labor they have to sell, and the right to do it is now recognized by both law and custom. Various professions get together in districts and agree upon minimum rates of charge for various types of service. Even the banks of various communities get together and agree upon the rate of interest they will pay and the rate of interest they will charge.

"Why is it economically sound and proper to let everyone else fix prices for the things they have to sell, as now seems to be the accepted practice, and deny the same right to agriculture, which is the most important and basic industry of all? The farmers are the only people in America who have no voice in fixing the prices of what they buy or what they sell. They are the victims of a 'price-fixing' era. This argument, coming as it does from the beneficiaries of 'price fixing' and their satellites, is the most unfair and ridiculous and unsportsmanlike argument that could be advanced."

Self Interest and Co-operation Will Not Mix

IN THE history of co-operative marketing attempts have been made a number of times to form working plans between private interests and co-operative marketing associations.

The California Fruit Growers' Exchange had an experience along this line in 1903, which its members remember with regret. For the purpose of eliminating competition and bringing about equal distribution, the exchange entered into an agreement with private independent shippers. The plan ended in failure and was discontinued at the end of the year. Since that time, the exchange has scrupulously avoided all entanglements with private interests.

The grain scandal is another example of the same kind. Well-meaning farm bureau officials entered into an understanding with Chicago grain interests according to which the farmers were to purchase the warehouses, business and good will of the latter for a huge sum. Fortunately, a provision was included which stipulated that the property and business were to revert to the original owners if

the farmers failed to make the payments as indicated, in which case all costs of organizing the farmers, selling stock, etc., would be met by the original owners. Sufficient stock could not be sold in the great grain belts and the properties and expenses reverted to the grain interests. Most people thought the matter was closed, but in recent weeks it has developed that the farmers would have had a great fraud perpetrated upon them if they had carried the proposition through. According to reports, a private investigation refereed by Edward E. Brown, vice-president of the First National Bank of Chicago, brought out evidence showing that samples of grain were changed or doctored, and that records were changed, to make it appear that the grain bought by the farmers was of higher grade than it was. The report is current that the failure of the grain marketing company was due to the loss caused by this misrepresentation, but according to our understanding, that is not true.

Several years ago a farm bureau committee organized the Federated Fruit and Vegetable Growers, Inc. An agreement was entered into with the North American Fruit Exchange whereby the business and so-called good will were to be purchased over a five-year period for a considerable sum. Another agreement was entered into with A. R. Rule, largest stockholder of the North American Fruit Exchange, whereby he was to be retained as manager at \$25,000 a year until the debt was paid. This arrangement has not worked out satisfactorily. The organization started strong, but it now appears to have little tonnage left. According to reports, the president resigned some time ago, no annual meeting has been held for about two years, and the directors and executives have not met for some time, although they were instructed to meet regularly and frequently at the last annual meeting. The organization has had trouble with its employees and many of them have left it, either voluntarily or on request. Just why matters have not turned out more satisfactorily is not altogether clear, but some persons familiar with the situation believe it was a mistake to permit the principle of self interest to be included in the arrangement which was made. At any rate, the Federated has not achieved the results which its organizers hoped it would.

These and other instances which might be cited indicate that self interest and co-operative marketing will not mix. The two ideas are diametrically opposed and cannot be reconciled with each other. Co-operation, to be successful, must be absolutely free from self interest. Growers who form co-operatives should insist on this principle being followed, for any other is practically certain to fail.

Why Was He Appointed?

SILAS STRAWN, the Chicago attorney who was appointed by President Coolidge as a member of the International Tariff Commission, expressed approval of the veto of the farm bill recently in a speech made in Montreal. According to reports, he stated that he could not conceive of any legislation that would set aside the inexorable law of supply and demand. "You cannot fix prices in the face of the law of supply and demand," he is reported to have said.

We wonder just why Mr. Strawn was appointed on the International Tariff Commission. We wonder also why he accepted the appointment. Surely, he would not make such statements if he clearly understood the principles of the tariff.

Every economist and every thinking business man in the country recognizes the tariff as one of the most far-reaching price fixing propositions in existence. The tariff is purely a product of legislation, and it is operating "in the face of the law of supply and demand."

The Pollination Problem in Fruit Growing

By A. B. Stout
New York Botanical Garden

WITH RESPECT to pollination requirements, all fruits may be grouped into two main classes, as follows: (A) fruits that require no pollination whatever, and (B) fruits that develop only after proper pollination and fertilization.

Fruits Requiring No Pollination

The Navel orange is an example of a variety that develops fruit without pollination. Its flowers appear to be perfect, but close examination and tests for germination reveal that the stamens yield only shrivelled pollen or perhaps only an occasional grain that is viable. But the fruits will develop and mature without any pollination whatever. They are purely vegetative or parthenocarpic fruits. With proper pollination from other orange varieties that yield viable pollen, the fruits of the Navel orange will sometimes bear seed. Such pollination is of course not desired in the commercial production of the Navel orange.

Certain varieties of the Japanese persimmon and the currant grapes (White Corinth and Black Corinth) also develop fruits without pollination. Certain apetalous types of apple bear fruits very similar in general morphology to those of the Navel orange in that there is the same type of double ovary. Also these seedless fruits develop without pollination but with pollination they often contain seeds.

But not all seedless fruits will form without pollination. The Thompson Seedless grape, for example, requires pollination and fertilization as fully as do seeded grapes.

For varieties like the Navel orange, the yield of fruit is entirely independent of the various uncertainties of pollination. It would therefore be of distinct advantage to horticulture if more varieties could be obtained with this habit of fruiting.

Fruits That Require Pollination

Most of the important fruits grown in commercial culture at the present time contain seeds; the development of the fruits depends on and is closely correlated with the formation of these seeds; and the seeds develop only after proper pollination and fertilization. The proper pollination of the flowers of these fruit crops is therefore a necessary and a very important link in the chain of processes

concerned in the development of fruit. Pollination that leads to fertilization is a prerequisite for fruit setting in all these fruits. Without it, there will be no fruit. Other conditions besides those of inadequate pollination may, of course, render plants fruitless.

Fruits That Are Self-Fruitful

A considerable number of the varieties of fruit that require pollination are able to produce fruit as a result of self-pollination. They bear flowers that are perfect, or at least a rather high percentage of the pollen is functional, and the flower parts are so formed and they develop in such

manner that the flowers are self-pollinating or are close-pollinating (from flower to flower on the same plant or variety). What is still more essential, the pollination is compatible and results in the fertilization necessary for seed and fruit formation.

Such plants may or may not require the agency of insects to effect pollination, but they do not require to be interplanted with other varieties. The Concord grape and the Montmorency cherry are good examples of varieties that are fully self-fruitful.

Fruits That Require Cross-Pollination

Among the tree fruits and small fruits, including especially grapes,

apples, pears, peaches, plums, cherries, blackberries and strawberries, certain seedling plants of both wild and cultivated stocks have flowers that for one reason or another require cross-pollination. Whenever such a seedling is propagated as a clonal variety (that is, asexually), the necessity for cross-pollination is extended to the entire variety as such. It is because of this that the pollination problem arises in commercial fruit growing.

Almost without an exception, the various fruits grown commercially are grown as clonal varieties. This means that the propagation is by such methods as grafting, budding, cuttings, layering, divisions, or the use of runners. All plants of the variety are, hence, merely branches derived from one original seedling. Within the variety there is a uniformity in the character of the flowers that multiplies and intensifies any deficiency which the flowers may possess in regard to adequate self-pollination. Within the clonal variety, pollination from flower to flower is no more effective than is pollination from flower to flower on the same tree. The entire variety is therefore quite as self-fruitless as is any single individual. The growing of solid blocks of the clonal variety automatically limits, reduces or even entirely prevents the chances for proper pollination.

Conditions Which Make Plants Self-Fruitless

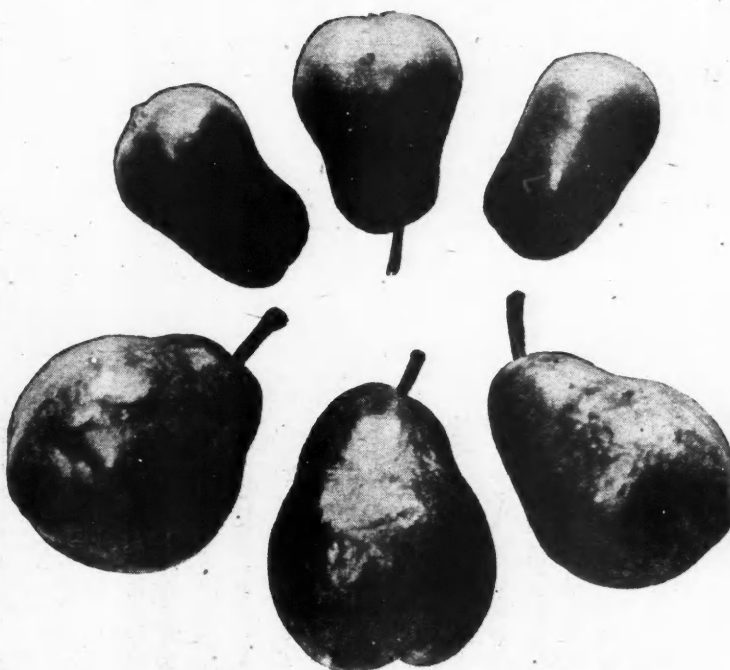
The two conditions which make a plant or an entire clonal variety of the main fruit crops dependent upon cross-pollination for the setting of fruit are (1) pollen sterility and (2) self-incompatibility in fertilization. This statement does not refer to the self-fruitlessness of nut crops or of various tropical fruits, such as the avocado, in which the conditions are quite different from those here mentioned.

Pollen Sterility

Flowers which have imperfect stamens are frequent in plants that are highly able to produce fruit. It may, therefore, be said that such plants are good females but poor males.

The flowers of the J. H. Hale peach appear with casual observation to be

(Concluded on page 26)



The Bartlett pear produces an abundance of pollen but is feebly self-fertile. In some interior valleys and coastal regions of California, it is somewhat self-fruitful, but the fruits are small and of poor shape, as shown by the upper three pears. When properly cross-pollinated, the fruits are larger, as shown by the lower three pears.



Left.—This picture shows the results of pollination tests with the Northern Greening apple conducted in England at the John Innes Horticultural Institution. The 14 apples at the left are the result of cross-pollination with another variety. On the right side of the tree, 211 flowers were self-pollinated but not one set fruit. (Reproduced by permission of Journal of Pomology and Horticultural Science.) Center.—Flowers of the J. H. Hale peach, a variety which is self-fruitless because the pollen is worthless. In some parts of California this variety is reported to yield good pollen and to set fruit from self-pollination. Right.—Montmorency cherries set fruit from self-pollination and do not require interplanting with other varieties. The fruits shown resulted from controlled self-pollination.

Fertilizing Apples in the Northwest

By C. C. Vincent
University of Idaho

APPROXIMATELY 44 per cent of the commercial apple shipments of the United States and 28½ per cent of the total production, representing about 50,000 cars annually, are produced in the states west of the Rocky Mountains. Shipments from the western states have reached a volume of from 37,000 to 63,000 cars

valuation of the surface soil has resulted in the burning out of the humus. When these orchards came into bearing the soil was in a very poor condition from a mechanical standpoint.

available plant food is furnished the tree.

There are several different methods of handling these crops, in the orchard. One method of handling alfalfa consists in using it as a green manure crop for the upbuilding of the soil by allowing the whole crop to remain on the ground year after year and rot. P. S. Darlington, formerly district horticulturist at Wenatchee, Wash., states that the Barney and Williams orchard has been in alfalfa for 20 years. The average bearing record of this orchard over a six-year period was 19 boxes per tree. Approximately 75 per cent of the orchards in the Wenatchee district are in alfalfa.

Another common system followed in some sections, especially where the trees are young, is to take a crop or two of alfalfa from the orchard as hay. If manure is placed back on the land much of the fertilizing value of the crop is returned. The third method consists of growing a cover crop for a period of two or three years, followed by clean cultivation for a year or two before reseeding.

Any one of these systems will furnish a constant supply of available plant food, although the first one men-

tioned apparently is the most popular among the orchardists.

Of late years there has been considerable agitation as to the advisability of using commercial fertilizers in our orchards. Some seem to think it absolutely essential to apply commercial fertilizer in order to maintain and increase the yield, while others do not see the need of such treatment. From experimental evidence now at hand, the supplying of commercial fertilizer to orchard soils is a problem in which there appears to be some differences of opinion. The results secured from fertilization tests have not been consistent and uniform.

Lewis of Oregon found that applications of nitrogen in the form of commercial fertilizer caused trees to become quickly reinvigorated, the foliage becoming thick, green and luxuriant, the wood growth satisfactory, the bloom increased, the percentage of set greatly increased, the fruit becoming larger and of finer quality, and the trees giving a much larger yield. In Washington, no pronounced results have been apparent from the addition of nitrogen in orchards that have been in cover crops for more than three years, especially where a good stand was secured and the crop had made a continuous heavy growth. However, it has been found that some orchards which have been clean cultivated for a number of years—the trees lacking vigor and producing irregular, small crops as a result—have responded to applications of commercial fertilizers. Applications of commercial fertilizer to several orchards in Idaho have not given the results we had been led to expect.

In one orchard in north Idaho, fertilizers have been applied over a period of five years. This block of Jonathan trees was planted in 1909 in a gravelly loam soil, characteristic of that locality. The trees were clean cultivated until the spring of 1919, when they were manured heavily and the ground was seeded to clover. The hay was taken off during the summers of 1919 and 1920, but in 1921 it was plowed under as a green crop after the clover had reached a height of approximately two feet. Since that time, clean cultivation has been practiced. The trees are 30 feet apart and are quite uniform in size and shape. The results secured are shown in the table at the end of this article.

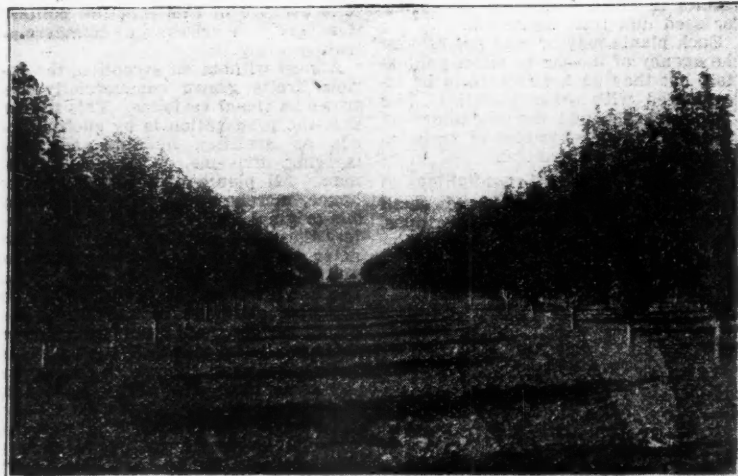
The results thus far seem to indicate that:

1. Fertilizers have not naturally increased the yield of the various plots over the checks. The nitrate plots show slight gains but nothing significant.

2. In color and general appearance, the fruit from the several plots is about the same. Color, no doubt, is dependent upon the amount of light reaching the fruit and not upon fertilizer ingredients.

3. The size of the fruit has not

(Concluded on page 29)



A clean cultivated apple orchard

during the past few years.

In the Pacific Northwest, Washington, Oregon and Idaho produce approximately 80 per cent of the boxed apples. Washington is now recognized as the leading box apple state, producing an average apple crop for the last five-year period of 22,767,000 bushels. The average annual production in Oregon is 4,177,500 bushels. Idaho follows with 3,582,500 bushels. The average acreage yields for the same period have also been high, with Washington leading with 253.7 bushels, Idaho with 141.4 bushels, and Oregon with 131.7 bushels.

The success, therefore, of the apple industry in these states is due largely to the high acre yields of fancy fruits. One of the factors making this possible is the available supply of plant food now found in our orchard soils. During the early development of the fruit industry in the Northwest, clean cultivation was commonly practiced. The orchardists soon realized that such a system was not conducive to high yields, so they began to provide for a goodly supply of organic matter in the soil through the use of cover crops.

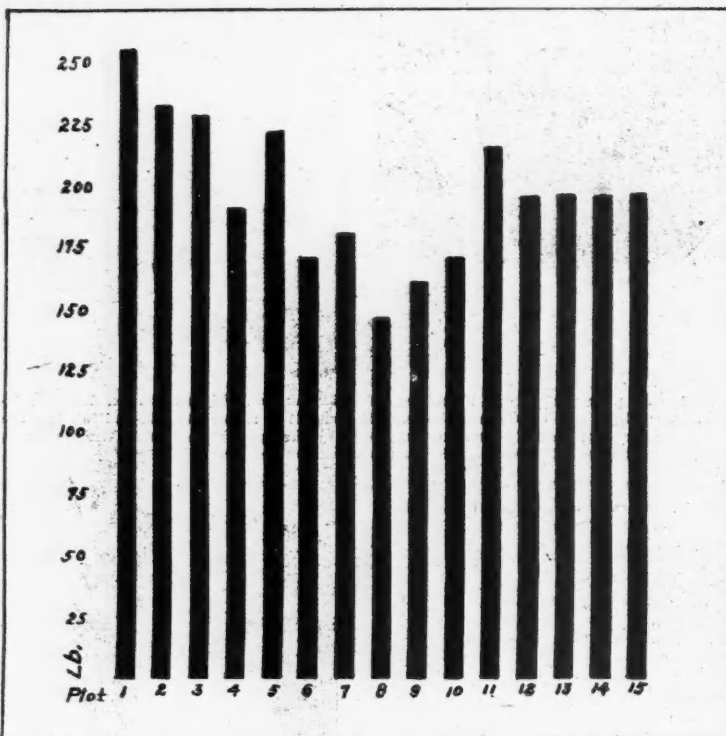
A study of the different systems of soil management practiced in one of our fruit districts of south Idaho may throw some light on this question. The common systems followed in many orchards under eight years of age for a period of five years was as follows:

System.	Per cent of orchards.
Clean cultivation.....	26.5
Clean cultivation and alfalfa....	19.0
Intercrops and alfalfa.....	15.3
Clean cultivation and intercrop..	13.2
Intercrops.....	9.0
Clean cultivation and clover....	5.0
Alfalfa.....	3.0

The leading facts in this case are (1) that practically one-half of the orchards under eight years of age have been clean cultivated, intercropped, or intercropped and clean cultivated, and (2) that the other 50 per cent have had either alfalfa or clover cover crops part or all of this

System.	Per cent of orchards.
Clean cultivation and clover.....	31.4
Clean cultivation and alfalfa....	25.2
Sod.....	18.4
Clean cultivation.....	16.8
Alfalfa.....	8.2

period. It is evident, then, in this case that the repeated summer culti-



Relative yields of various fertilizer plots in pounds—four-year average

Orchards eight years of age and over for a period of five years were handled as described in the preceding table.

These figures show that approximately 17 per cent of the older orchards have been clean cultivated during this period. Such a system of orchard management leaves the soil in a very poor physical condition.

All leading fruit growers now recognize the fact that in order to build up and maintain a constant supply of available plant food in the soil, cover crops are essential. Alfalfa and clover are the principal crops used, alfalfa being preferred where there is plenty of water. The roots of alfalfa plants often penetrate the soil to a depth of 20 feet or more, thus keeping the soil open and porous. Both clover and alfalfa are legumes and have the ability to gather nitrogen from the air and store it in nodules on the roots. As these roots decay,



A good cover crop in a young orchard

Topworking Unprofitable Sweet Cherry Trees

By James A. Neilson
Ontario Horticultural Experiment Station

THESE are many sweet cherry trees in Ontario which do not yield a profitable return. This may be due in part to unsuitable soils or stocks, but it is due more largely to factors such as self-sterility or inter-sterility of varieties, the low market value of varieties which were once considered valuable, or errors on the part of nurserymen in supplying the trees. There are also many trees of seedling origin, growing as escapes along fence lines, roadsides, or on the home grounds, which are comparatively valueless in their present condition. The presence of these unprofitable trees occasions a

decided loss to the grower, as they require the same cultural treatment as better trees. The wayside or fence line trees do not usually get much attention, but nevertheless they are a liability in that they do not yield any return for the space occupied.



The picture at the left shows the appearance in September, 1926, of growth made from buds set in August, 1925. The seedling tree shown on the right was budded in August, 1924, and the picture was taken in September, 1926

Many attempts have been made by growers to increase the value of their poor trees by topworking with good pollinators or better varieties. These efforts have unfortunately not always been successful. As a matter of fact, the failures have been much greater than the successes in Ontario at any rate, and possibly the same holds good in some of the eastern and central states as well. The numerous failures met with in the topworking of the sweet cherry have shown the need for methods that would enable growers to get better results than have hitherto been possible, and this was the main factor which caused the Vineland Experiment Station to undertake experimental work along this line.

The topworking project was started in the spring of 1924 and was carried on at the experiment station and in a few orchards in the Niagara district. In all, 56 trees were used in the initial trials, and these varied in age from seven to 17 years. Inasmuch as the experiments were started in the spring, it was necessary to begin with grafting. On some of these trees the branches were fairly large, and therefore it was decided to use the channel graft. This method was chosen because it permits of a relatively large area of cambium contact and does away with the necessity for splitting the branch as in cleft grafting. The channel graft, it should be explained, consists in cutting off the branches at suitable points and in making narrow channels two to three

inches long in the bark at the end of the stock. The scion is prepared by reducing the lower end to one-half the original diameter for a distance equal to the length of the channel and then very lightly paring the edges of the reduced section. The scions are then fitted into the channel and fastened in place with small nails or brads. Melted grafting wax was applied over the points of contact and on the end of the stub. The

scions were not coated with paraffin; neither were paper bags tied over the scions to lessen or prevent evaporation. The failure to protect the scions by one or the other of these methods was a mistake, as will presently be shown.

Grafting Almost a Failure

The result of our first attempt to graft the sweet cherry was very disappointing indeed, not more than 10 per cent of the scions growing out of more than 600 which were set. This, of course, is altogether too low a set, but from observations subsequently made, it seems to compare favorably with results obtained by others in grafting the sweet cherry in this province.

Our failure to secure a good stand of scions in the spring induced us to try budding as the next expedient. A considerable number of buds was therefore placed on the small growth which developed as a result of cutting back done in grafting during the preceding spring. A number of buds were also placed on branches three-fourths inch up to two inches in diameter to determine the value of the larger branches for budding. The shield method was used for both classes of growth, and following the usual custom, the buds were tied in place with raffia.

Budding More Successful Than Grafting

The results of budding on the sucker growth, while more satisfactory than grafting, scarcely met our expectations, but on the older branches, a better set of buds was unexpectedly secured. This was probably due to the bark pressing more closely to the buds than was the case on the sucker growth.

Shortly after the budding was completed, the writer observed more than

100 trees which had been successfully topworked when from six to eight years of age by budding on the main branches. In some cases, a very good set of buds had been secured on branches more than two inches in diameter. These trees were located at various places in the Niagara district and had been topworked by different people working independently of each other and without any of them being aware of what the others were doing.

The good results obtained by these growers, and the favorable but less extensive results secured in our experiments on the larger branches, suggested the desirability of further work along this line.

The Plate Bud

At about the same time, some new information was also obtained on a method of budding called the plate bud. This method was drawn to my attention by J. F. Jones of Lancaster, Pa., who uses it entirely in propagating large numbers of sweet cherries. According to Mr. Jones, the plate bud method gives a much higher percentage of unions than the shield bud, and moreover is easy to use. Mr. Jones also suggested the use of waxed cotton as a material for tying the buds in place instead of raffia. It was claimed by Mr. Jones that waxed cotton was much better than raffia, particularly for the plate bud.

Inasmuch as the plate bud does not appear to be widely used or known, a brief description may be of interest to the readers of this article. For this method, branches one-fourth to one inch in diameter may be used with satisfaction. The branch is prepared for the bud by slicing downward for a distance of one and one-

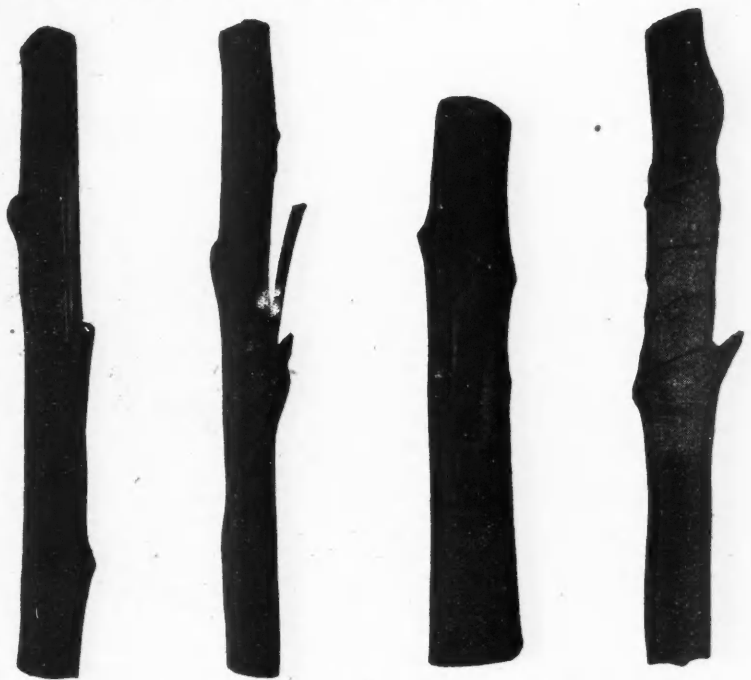
moving the bud strip, the cut should be made deep enough to include a thin slice of wood, particularly under the bud. The bud is then placed by inserting the lower part of the strip underneath the loose flap of bark left on the stock and aligning the edges as closely as possible with the edges of the exposed area on the stock. When the cut on the stock is noticeably wider than the bud strip, it would be advisable to insert the bud diagonally across the cut surface so as to be certain of cambium contact. After the bud has been placed, it is tied and waxed as described further on in this article.

Results for Season of 1924

As will be seen by a perusal of the above, the experiments for 1924 were not an unqualified success by any means. Grafting was practically a failure, and budding was only partly successful. Notwithstanding the negative results, it was felt that progress had been made in that the reasons for failure were found and new information had been obtained on the technique of budding. The fact that a considerable number of trees had been successfully topbudded by growers was also a decided encouragement.

Work for 1925

Profiting by our observations and experiments of 1924, and believing that the new ideas gathered would produce better results if applied, plans were made to continue the work on a larger scale in 1925. A circular letter sent out to about 1500 growers brought forth many requests for information on how to convert the poor trees into good ones. Special efforts were therefore made to give these growers the desired information either by a demonstration or by doing the work for them. Work was done in 35 orchards by members of the station staff or by growers under our instructions, and in all approximately 400 trees were budded.



Left to right in order.—Stock with bark removed ready for bud; bud set in position; showing how to place bud when cut on stock is wider than bud strip; bud set, tied and waxed

half to two inches a strip of bark with a very thin bit of wood attached. This loose bit of bark is not removed entirely but is cut off about three-fourths inch above the lower end of the slicing cut.

The bud may be cut from the bud stick by inserting the knife in the bark about one-half inch below the bud and slicing upward to a point about one and one-half inches above the bud, or if preferred, the cut may be made from above downward. In re-

In carrying on the work for 1925, we confined ourselves entirely to budding either by the shield or plate method. The shield method was used on branches of one inch to two inches in diameter, and both the plate bud and shield bud were used for the smaller branches. Raffia was used for tying buds in 1924 but was found to be unsatisfactory and was therefore discarded in favor of waxed cotton. This material was torn into

(Concluded on page 37)

Pollination Problems in Wenatchee Valley

By A. R. Chase

OUR CHIEF varieties of apples raised in the Wenatchee Valley, namely Winesap and Delicious, require cross pollination with other varieties in order to set fruit. This is an outstanding fact proven by W. A. Luce, horticultural investigator of Chelan county, in two years of systematic field experiments carried on in various orchards of the Wenatchee Valley in 1925 and 1926. Both varieties are self-sterile, and while the Delicious will pollinate the Winesap, the Winesap is worthless as a pollinator of the Delicious.

Growers Visit Demonstration of Results

During 1926 the results were so clear cut and convincing, even to the eye, that a special field trip was arranged by the county agent so that the orchardists could see the demonstrations at first hand. One hundred and twenty-five orchardists especially interested in the pollination problem observed the results in three different orchards. These observations answered the queries of many growers as to why our Winesap apples, especially in solid blocks, often fail to set a sufficient amount of fruit. After seeing branches heavily laden with fruit out in the orchard, which had been hand pollinated with pollen of certain varieties, and others which were bare of fruit where other crosses had been made, the growers present were convinced of the necessity for proper cross pollination.

Cherry Pollination Results Started Investigations

When V. R. Gardner, formerly of Oregon Agricultural College and now head of the Department of Horticulture of Michigan State College, first stood upon the Chautauqua platform at The Dalles in 1912 and showed the cherry growers there assembled the visible effects of cross pollinated and self pollinated cherries, he unfolded a big idea not generally known by tree fruit growers in the Northwest. It took 10 years to sell this idea to the cherry growers in general. Now the Northwest sweet cherry grower who sees "an inch beyond his nose" never plants a cherry orchard without providing for pollinizing varieties. It has been only in very recent years that the pollination problems of other tree fruits, such as pears, peaches, pears, apples, etc., have begun to attract the attention of the horticulturists. Experimental work has since been carried on with many varieties of tree fruits.

Prof. O. M. Morris of the Department of Horticulture of the Washington State College has been interested for some years in the pollination problems of the pear and the apple, and Mr. Luce, co-operating with Mr. Morris, has worked out certain definite pollination results.

d'Anjou Pear Must be Cross Pollinated

Last year Luce's conclusions on the d'Anjou pear were definite enough to warrant the announcement that this variety in the Wenatchee district must be cross pollinated with other varieties. Orchardists generally have accepted this fact and practically all new plantings of d'Anjou are being provided with abundant pollinizers.

The Apple Problem is a Large One

Just whether we can sell the idea of cross pollination for the apple varieties of Winesap and Delicious as convincingly as we have done in the case of the sweet cherry and the d'Anjou pear remains to be seen. In the case of apples, we have several difficulties to overcome that are not present in cherries and pears.

Our cherry acreage and pear acreage are yet comparatively small. The addition of the proper pollinizers and the importation of bees usually gets immediate results as soon as bloom is abundant. The introduction of a pollinizing bouquet in a sweet cherry tree is almost sure to make a visible demonstration so that the rank and

file of the fruit growers can see the results with one eye open.

Winesap Produces Little Pollen

Honeybees like to work on pears and sweet cherries, but the Winesap apple blossom apparently does not attract them in any numbers. The Winesap in this territory is practically devoid of pollen.

Luce has found that it is a long tedious job to gather enough Winesap pollen to pollinize a few branches for experimental purposes. Whether

the apple is also shy of nectar has not yet been ascertained.

Getting the Bees to Work

During 1926 the county agent was instrumental in securing 600 stands of bees placed in various orchards in the Wenatchee Valley. A majority of the growers were unable to find that the bees worked extensively in the Winesap apples, although nearly all report better sets of fruit from some cause. In the Wenatchee Valley proper there is an abundance of

other bloom at apple blossom time and an enormous acreage of apple bloom to cover. We have been dependent the last few years almost entirely on native insects, which fortunately are quite numerous in the surrounding hills.

Charles Simpson, living near Quincy in Grant county, estimates his 1926 crop at 80,000 boxes. In other years he has been averaging 20,000 to 40,000 boxes, although his orchard has always shown a heavy set of bloom. There are a few native insects in that part of the country. The county agent had often talked bees to Mr. Simpson and this year for the first time he rented 60 stands. The bees there had to work on apples, because there was nothing else for them to visit. Boston Brothers of Ellensburg, who supplied the bees, reported that the colonies averaged less than one-half as much honey as they did in the Wenatchee Valley, where at blooming time there were so many other blooming plants to attract the bees. Mr. Simpson is positive that the bees got results, and has ordered 100 stands for next year.

Therefore, while we have established some important facts in apple pollination, we still have an entomological problem to solve; that is, we must devise a way to get bees to visit apple bloom where other bloom is abundant, or we must encourage the propagation of wild insects which apparently are not so fastidious.

Fertile and Sterile Varieties

The results of Mr. Luce's hand pollination work show up in the form of clusters on branches properly pollinated and only scattering fruit or none at all on check branches which have been selfed.

Experiments were carried on in seven different orchards and on several varieties in different trees, so that the effect under varying degrees of vigor could be measured. For instance, Mr. Luce found that both Winesap and Delicious when self-pollinated and bagged to exclude insects bore no fruit whatsoever. In an orchard of high vigor, Delicious set as much as 31.1 per cent of the bloom on Winesap, under moderate vigor 7.4 per cent on Winesap, and under low vigor 2.8 per cent. But even in the most vigorous orchards the best result from Winesap on Winesap was 5.3 per cent, and in orchards of low vigor there was no set of fruit. Delicious pollen on Delicious gave a set of fruit varying from 1.4 per cent to nothing. Both of these were open to outside insect pollination. Just as interesting were Luce's results with other varieties. Arkansas Black and Stayman under our conditions were self-sterile, and the Stayman, another of our common varieties, was practically sterile on the Winesap.

Jonathan and Rome, two of our common varieties, produced good pollinizing results on Winesaps in orchards of good vigor and are generally recognized here as good pollinizing varieties.

The Tendency in Varieties

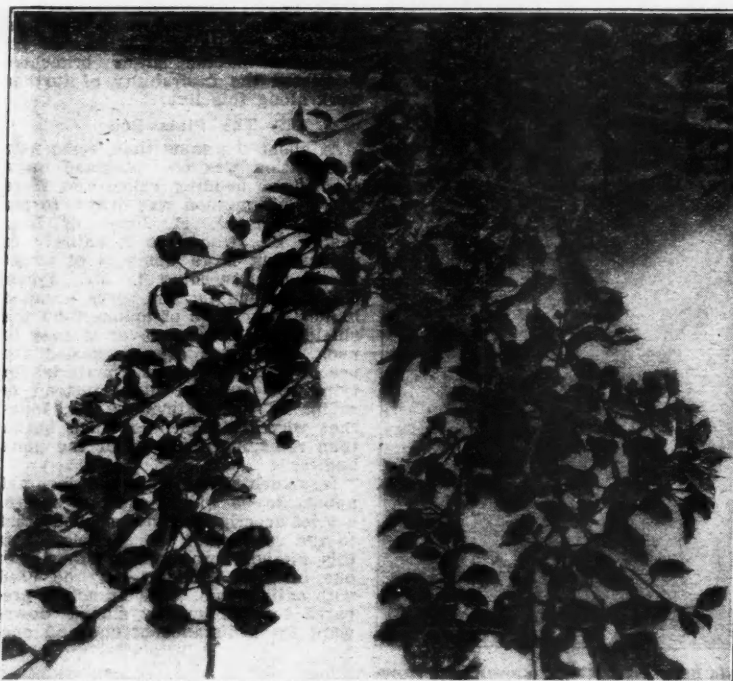
It must be remembered that where a few years ago the commercial varieties of the Wenatchee Valley numbered over a hundred, we have been rapidly taking out all but a half dozen varieties, and the drift has been strong toward two varieties, namely, Winesap and Delicious. Over 50 per cent of our plantings now consist of these two varieties, and all new plantings consist almost exclusively of Winesap and Delicious.

It is evident that we must maintain a balance of pollinizing varieties. Probably the Rome, Jonathan and Winter Banana will be the choice of the growers.

Insect Activity

The necessity for some form of insect activity at blooming time is the outstanding fact which we are now

(Concluded on page 32)



This Winesap branch was exposed to the action of insects. A rather poor set of fruit resulted



These two Winesap branches show the results of artificial cross-pollination. The blossoms on the left branch were pollinated with Delicious pollen; those on the right branch were pollinated with Jonathan pollen

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for April, 1927

A Promising Legume Cover Crop for the Orchard

By G. P. Walker

THE VALUE of lespedeza or Japan clover as a pasture crop has been recognized in the states south of the Ohio River and in southern Indiana for a number of years. It is only recently, however, that it is coming to be recognized as a worth while crop for use in orchards which are kept in sod instead of being cultivated. Its ability to gather nitrogen from the air, to grow on sour, thin soils, to compete with grass and weeds, to withstand droughts, and to reseed itself year after year, not only makes it a good pasture and soil improvement crop but a valuable legume for use in the non-cultivated orchard. Its tough fibrous root system enables it to hold on tenaciously on thin slopes, and when once established, it makes an extremely thick growth, ranging from six inches to a foot high, that is a valuable aid in checking erosion. After this dense mass of high protein material decays, it furnishes a large amount of nitrogen for the growth of new wood and formation of fruit buds.

Good for Thin, Rolling Land

C. L. Burkholder of the horticultural division of the Extension Department at Purdue University endorses the crop in these words, "It is the only legume crop that we have found for the thinner rolling orchard land in southern Indiana that will stick and gradually get thicker where no grass but poverty grass will grow." Unlike most of the annual crops used for cover crops, the "Little Japs," as one man called it, reseeds itself. County Agent Otten, of Vanderburg county, Indiana, reports very favorable results from lespedeza in the orchards of that section and states that the men who have tried it like it very much.

While the ordinary lespedeza or Japan clover has a real value along the Ohio River and throughout southern Indiana, it is not adapted to the northern half of the corn belt. The seed is produced so late in the fall that the crop will not reseed itself successfully when taken farther north than Indianapolis. A new strain, the Korean, matures seed from a week to 10 days earlier than the average Japan strain and is reseeding itself as far north as Lansing, Mich., and in Iowa.

Korean Better Adapted for Northern Locations

The Korean strain is a heavy seed producer and grows somewhat ranker than the Japan. There is not any large commercial supply of seed as yet, but anyone wishing to get a start of it may get a small amount and grow his own seed. T. J. Shively of Owen county, Indiana, followed this plan last year and sowed a pound and a half of seed obtained from Purdue University on a small hillside garden plot. He pulled the weeds out of it twice to make the job of harvesting seed easier, and he made the following report of his results: "I flailed out about 35 pounds of good seed from my tenth-acre patch and have it with a lot of seed left in the straw for sowing in the orchard this winter. I believe this is a fine orchard cover crop for hill land like mine that is too sloping to cultivate. It bloomed in August, and before frost it had made a growth of 20 inches to two feet high and so thick I could scarcely walk through it."

Easy to Start

One thing that has surprised many farmers who have tried this crop is the ease of getting it started. Most seedings have been made by broadcasting a few pounds of seed per acre on old pastures or thin sod while the ground was frozen and letting the freezing and thawing work the seed in. This method makes the cost low, but it takes from two to three years for the crop to thicken up to a full stand. A seeding of 20 pounds per acre is required if a full stand is desired the first year. Good results

have also been obtained by seeding with oats or by light disking of thin sod early in the spring to help cover the seed. Lespedeza seed is slow to germinate, and the plants make little growth until July. The results are sometimes disappointing the first year, but after the crop reseeds itself to a full stand, it produces a thick carpet like a mat of fine stems and leaves which furnishes a dense, heavy covering for the ground after growth is stopped by freezing and holds the frost in the ground longer in the spring.

Increase your profits this year by planning your work, so as to get the maximum from each day's labor.

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Ask your local Dodge Brothers dealer for the Vocational Book which features the use of trucks and commercial cars in your particular line of business.

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Disease-Free Raspberry Plants Produce Better Product for Canning

H. H. HANCHETT of Sparta, Wis., gave an interesting account in a recent issue of *Minnesota Horticulture* of his experiences with sprayed and unsprayed raspberries. When the Latham was first introduced, it seems that this variety became known under two names, the Latham and the Redpath. Mr. Hanchett purchased plants under both names. When the berries were canned, he found that the berries of the so-called Redpath variety were superior to those of Latham in color, flavor, firmness and quality of the juice. He was inclined to believe that

the berries were two separate varieties and that the Redpath was much superior. Later, however, he found that the Redpath plants had come from a source free from mosaic and that the Latham stock had come from a place badly infected with mosaic. Mr. Hanchett learned eventually to his entire satisfaction that the difference was one of disease infection and not of variety. He thinks the Latham is the finest raspberry in existence.

"Rabbit and Mice Control in the Orchard" is the title of Circular 151, written by T. J. Talbert and issued recently by the Missouri Agricultural Experiment Station, Columbia, Mo. Address the station for a copy.

Summary of Fruit Prospects

By C. E. Durst



You might just as well have the best

THERE still seem to be a great many people who have the idea that Kelly-Springfields cost more than other makes of tires.

This impression speaks well for the Kelly reputation, but as a matter of fact Kellys don't cost any more than the ordinary tire of the better grade. In other words, whether you buy Kellys or not, you are paying for Kelly quality—and you might just as well have what you are paying for.

Kelly also makes the Buckeye, a lower-priced tire that at its price represents unbeatable value.

"Kelly dealers everywhere—there must be one in your town."

KELLY-SPRINGFIELD TIRE CO.
250 West 57th Street, New York, N. Y.

KELLY SPRINGFIELD PNEUMATIC TIRES

The Stationary Spray Plant

GENERAL BULLETIN 212, recently issued by the Washington Agricultural Experiment Station, Pullman, Wash., gives the results of a comprehensive investigation of stationary spraying plants. The author is Harry L. Garver. Since Washington leads all of the states in the use of this type of spraying plant, this bulletin is of particular interest. While the bulletin is intended particularly for residents of Washington, growers in other states can obtain copies in all probability by addressing the experiment station.

The advantages and disadvantages of stationary spraying plants are summarized in the bulletin as follows:

Advantages.—Does not damage irrigation ditches. Irrigation may continue while spraying.

Can be used in early season when ground is soft.

Adaptable to rough, hilly country. Does not injure or knock off fruit.

Does not break the low hanging branches, thus making it possible to prune for low, wide spready trees.

Increases the amount of spraying per man.

Less wear and tear on machinery, due to its being well anchored to a solid foundation.

Lower power costs.

The outfit is adaptable to other uses

(example: sprinkling the garden and lawn).

Does not jar out of adjustment as easily as the portable outfit.

Permits each sprayman to work at his own natural gait.

Does not pack the soil.

Disadvantages.—

Loss in pressure in long lines, due to:

(a) Too small pipe.

(b) Leaky joints and connections.

High first cost. (This may in some instances be more than that of a portable rig for the same work.)

Possibility of omitting trees, especially when spraying is being done by hired help or when no definite system is used.

Slaughters Sparrows

COUNTY AGENT L. R. Marchant of Knox county, Illinois, killed 3800 sparrows one evening that were roosting in vines around some public buildings. After the sparrows had gone to roost, he dusted some calcium cyanide dust into the vines with a dusting gun. In a very short time the sparrows began to drop to the ground. Calcium cyanide used properly is helpful in controlling not only sparrows, but ground squirrels, gophers, ground hogs and other pests as well. The only precaution necessary is that the operator should avoid breathing much of the dust.

IN RECENT years we have published in the spring months a summary of fruit conditions and prospects in different sections. This service has apparently been appreciated, and we shall therefore publish a similar summary during the next two or three months. After that time, the government crop estimates will cover the situation effectively.

In the summaries given below, the state covered by the report is named, and the date of the report and the name of the person furnishing it are also included. The giving of opinions on crop prospects at this season of the year is a treacherous undertaking. The best authorities can easily make mistakes. Conditions change rapidly. These factors should be taken into account by subscribers in reading the summaries.

New York (March 8).—Fruits in all parts of New York have gone through the winter well. There have been no low temperatures in any fruit section of the state, and even tender fruits have not suffered. Spring frosts still threaten, but these need scarcely be taken into account, except for early fruit, such as apricots and peaches.

It is impossible to estimate the prospects for apples. It is the off year for Baldwins and several other standard varieties, and growers are expecting a smaller crop of these. Considerable numbers of trees of undesirable varieties have been removed this winter. The next few years will witness a good deal of slaughter of old apple trees of standard varieties and of many trees of worthless varieties, and the grafting over of many trees to other varieties. Nurserymen report small sales of fruit trees except sweet cherries, for which there is an unusual demand.—U. P. Hedrick.

New Jersey (March 8).—It is somewhat early to judge the fruit prospects in New Jersey. We seldom have any bud injury during the winter, even to peaches. No injury of any account has occurred this year. The set of fruit buds last summer was somewhat lighter than the crop of the previous year in the case of both peaches and apples. However, there appears to be plenty of buds for good crops of all kinds. Our greatest danger lies in an exceptionally early spring and the occurrence of frost after the trees come in bloom. The season is not abnormally advanced, and peach buds are only slightly advanced.—M. A. Blake.

Virginia (March 8).—Fruit buds have come through the winter without damage. We had a favorable fall and a mild winter. During the week of February 21, the temperature averaged 65 to 70 degrees during the day, and this caused bud development of many fruits, particularly peaches, plums, pears and cherries. A cold wave on March 2 to 3 checked development, and cool weather for the past 10 days has held the buds back. We anticipate an early spring but are optimistic over prospects.

Peach buds over the state have never been in better condition. We do not expect as many apples as in 1926. Accurate predictions cannot be made for about two months, but at present the prospects are good for a fine crop of all fruits.—F. A. Motz.

Georgia (March 7).—Hiley and Elberta peaches are in full bloom, and many other varieties are starting. The blooming season is about three weeks ahead of last year and about two weeks earlier than normal. The bloom of all varieties is heavy—heavier than last year, when our record crop was produced. The low temperatures reached in early March did practically no damage.—O. I. Snapp.

Ohio (March 10).—Peach buds and other vegetation are advanced further than usual. In northern Ohio, peaches are in generally favorable condition, not over 30 per cent of the buds being dead. Winter injury has been serious in an occasional locality. Low tem-

peratures in the near future would be serious, especially in southern Ohio. Apple buds are looking good.—J. H. Gourley.

Michigan (March 8).—Fruit buds of all kinds are dormant at the present time. Apparently, there has been little winter killing except in the case of peaches. In the heavy peach producing sections of the state, there has been some injury to the buds. In some cases, this has not been serious enough to reduce the crop appreciably; in others, the injury has been sufficient to make a considerable difference in the crop. Probably the only definite statement that can be made at the present time is that the peach crop will be somewhat lighter than that of last year.—V. R. Gardner.

Illinois (March 7).—The apple crop of Illinois promises to be good. In localities in which the production was heavy last year, there may be some reduction in crop due to the dry summer. At present, there are sufficient peach buds left in most places to permit a full crop. Reports of a complete loss in some limited areas have been received. Bloom promises to be early, involving a greater frost hazard.—M. J. Dorsey.

Missouri (March 7).—The prospects for all fruits are very good at this time. All of them passed the winter in excellent condition, and if spring frosts do no damage, we shall have good crops.

Peaches have been damaged in central and northern Missouri, but reports from southern Missouri indicate a good crop. There is still, of course, danger of frost injury.—T. J. Talbert.

Arkansas (March 6).—It is too early to make a definite estimate. As a whole, apples appear to be about 70 to 80 per cent of normal at present. There is every reason to expect a heavy crop. The production per acre will probably be below that of last year due to the heavy crop of last season, but many new vineyards will bear their first crop this year.

The cherry crop is normal. Peach buds have suffered a heavy mortality due to two late freezes, but there are still sufficient buds left for a good crop over the state. Some growers in the Nashville district think the crop will be a little lighter there. Strawberries are in good shape, and we expect a large crop if weather conditions are favorable.—J. R. Cooper.

Tennessee (March 7).—Commercial peach orchards are advanced at least three weeks ahead of normal and are blooming in the Chattanooga district. The recent cold wave killed about 50 per cent of the buds in this district. The damage is less in the mountain sections around Kingston and Clinton.

Prospects for early apples in the Tennessee basin are for about 50 per cent of a crop. The scattered orchards of winter varieties show varying conditions. Orchards which have been fertilized promise a light crop, and the buds are not in serious danger of being killed by frost.

Sanitary conditions in orchards are excellent. Dormant spraying of peaches is almost completed. Apple growers are waiting for the proper time to apply the delayed dormant spray. They will use oil emulsion for scale and aphid control.—J. L. Baskin.

Texas (March 9).—The open winter and excellent moisture conditions have caused Texas fruits to bloom earlier than normal. We have had a few cold spells, but so far no material damage has resulted. With favorable March weather a large crop of all kinds of fruit should result. Many growers have increased their plantings because of the favorable conditions.

Grapefruit and oranges from the valley, and strawberries from several sections, are moving in carlot quantities. The citrus plantings now exceed 5,000,000 trees, about one-third of which are in bearing. There are upwards of a million budded stocks in nursery rows.—H. H. Schutz.

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Colorado (March 8).—The winter has been favorable for all tree fruits. Weather during the winter was dry, but abundant rains last fall, and snowfall and rains recently, have supplied excellent conditions. Pruning is practically completed, and spring work is well advanced.

The ruling of the Federal Pure Food and Drug Division will tend to eliminate poor apple orchards, especially in sections in which the codling moth is hard to control.

Present indications are that Colorado will have a normal apple crop. Our critical period for this crop is from April 20 to May 10. Considerable decrease of acreage has taken place in Grand Valley and this may reduce production.

Peaches promise a full crop in all sections, and the orchards are in better condition than usual. The acreage is now about three times what it was three years ago. Cherries, plums and apricots give promise of a full crop.

—E. P. Sandsten.

Washington, Yakima Valley (March 8).—The Yakima Valley has now produced two heavy crops in successive seasons, and we do not expect another large crop this year. Furthermore, there have been enough trees of undesirable varieties taken out during the winter to reduce the yield about 1000 cars under normal conditions.

The peach buds were severely injured by the September freeze and the severe cold during the winter. This report covers the Yakima section only.

—Luke Powell.

California (March 9).—In general, the conditions in the citrus industry are reported to be good. There have been no winter frosts, and heavy rains have visited the entire state. Growers in the Sacramento and San Joaquin valleys are very much encouraged over the fruit prospects. If favorable weather follows, there should be an abundant setting of fruit. Last year's olive crop was decidedly below normal, and a heavier production is expected this year. The Mamme or winter crop of Capri figs is especially good in the San Joaquin Valley, and the Calimyrna crop should therefore be good.

California (March 8).—Heavy rains in January and February retarded planting, cultivation and all orchard work. There will be an abundance of water for irrigating because of the heavy snowfall in the mountains. Spraying is now well under way for the control of peach leaf curl and peach twig borer. No frost damage has been reported to date.

A severe outbreak of peach rust occurred in several fruit sections last fall. The University of California has delegated two men to study control methods for this disease.

—A. H. Hendrickson.

Sleet Storm Damage in Arkansas

ONE OF the worst sleet storms on record visited Arkansas on February 4. Highways were blocked in many places, and it was several days before the debris could be cleared away sufficiently to permit normal traffic.

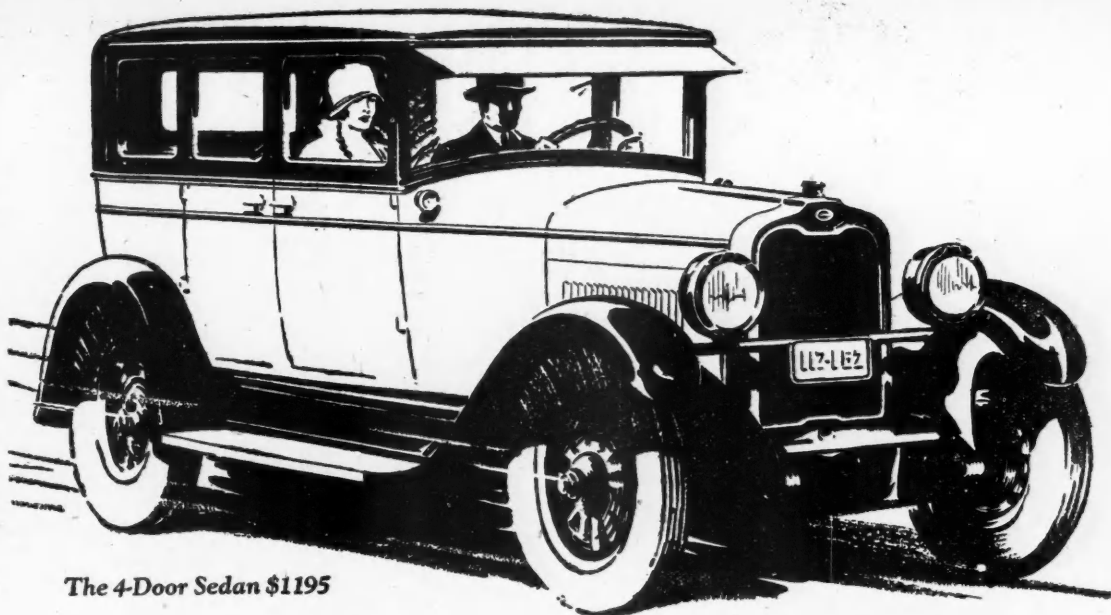
Many fruit trees were badly broken by the ice which formed on the trees, and in many cases old trees were uprooted or broken off.

Dr. M. J. Dorsey of the University of Illinois reports that the storm also did considerable damage in southern Illinois and Kentucky.

Orchard Should Be Cultivated Now

THE DROPPING of fruit, both apples and peaches, is largely due to lack of water during the season when the fruit is rapidly increasing in size. An average peach tree, normally to mature its crop, will require in the neighborhood of 3000 gallons of water in the growing season, according to J. R. Cooper, horticulturist, College of Agriculture, University of Arkansas.

"An apple tree will require twice as



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much water, because of its larger size. To maintain a constant supply of water throughout June and the first part of July, it is necessary to hold the water that is now in the soil, and that which falls from now on, by constant and thorough cultivation.

"Cultivation should continue up to the first of July and should be thorough enough to keep down all vegetation. It is impossible to produce a normal crop of fruit and support a crop of weeds or even a cover crop during May, June, July and August. The severe checking of growth, even though sufficient moisture is had later, means a partial loss of crop. It may also mean at least a partial loss of next year's crop due to the formation

of an insufficient number of fruit buds. The orchard should never be allowed to stand in the spring until it becomes too hard to plow."

Dead Hens for Fertilizer

By Carroll D. Bush

ONE OF the fruit growers in Oregon has found that dead hens make an excellent fertilizer for young fruit trees. He keeps about 800 hens in connection with his orchard, and the loss of hens by death amounts to from three to eight per cent in different years.

He has adopted the practice of placing a dead hen in the vicinity of every

young tree. He bores holes with a post auger beside the trees, inserts a dead hen and covers the same with soil. He has already covered half of his orchard. He states that trees removed a couple of years after a chicken had been planted had developed a mat of fine roots in the vicinity of the dead hen. In many cases, the feathers and bones were held in the firm grip of the roots.

George A. Scott, sales manager of the Florida Citrus Exchange, was elected vice-president of the American Fruit and Vegetable Shippers' Association at its convention held in Chicago in February.



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EVEREADY COLUMBIA Dry Batteries

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Fertilizing and Pruning of Sour Cherries

MODERATELY vigorous sour cherry trees will respond to applications of nitrogenous fertilizers even when kept clean and sown to a cover crop, according to Bulletin 541 of the New York Agricultural Experiment Station, which was written by H. B. Tukey. No evidence has appeared which indicates that phosphorus or potash will give benefit, either when used alone or in combination with nitrogen.

Little or no increase in yield occurs the first year after fertilizers are applied. When nitrogen is the limiting factor, some gain may be expected the second year, and still more may be expected the third year. Increased shoot growth and increased growth in general, larger leaf size and delayed maturity of the fruit are associated with the increases in yield.

Some sour cherry trees, especially Early Richmonds, tend to grow erect and tall. Trees which have reached too great a height for economical harvesting may be lowered by severe pruning of outside lateral branches. Pruning alone is insufficient. Applications of nitrogen are necessary to restore heavily pruned trees to vigor. A decrease in yield may be expected the first season following; the yield may largely be recovered the second

season; and the third season it may be expected to surpass that of the untreated trees.

English Morello trees behave in much the same fashion. The pruning of these should be directed toward thinning out of unproductive wood and cutting back to outside lateral growths. This treatment, in combination with applications of nitrogen, should renew the vigor of the trees and maintain or increase production.

Possible Competitor of Nicotine

NICOTINE may soon have a competitor as an insecticide for plant lice as a result of experiments conducted by the United States Bureau of Entomology. Experts of the department have found that an oil prepared from pyridine, which is an essential part of nicotine, is poisonous to plant lice when combined with sodium. Like nicotine, this oil will destroy plant lice without injuring the plants. The entomologists believe that dipridyl oil, as the new material is called, may prove even more effective than nicotine for the control of certain insect pests. The material has not been made in large enough quantities for commercial use as yet, but it is believed that the material can be made as cheaply as nicotine.

Control of Small Fruit Diseases

By A. S. Colby
University of Illinois

SOME PEOPLE believe that if they could have had a hand in choosing their grandparents, they themselves would have stood a better chance to succeed in life. Be that as it may, it is true beyond question that the small fruit grower, anxious to produce profitable crops, will do well to look to the ancestry of the stock he plants. Stock infected with disease is unprofitable. Plants from stock rendered weak and unproductive through disease will in their turn be weak and sickly. The time to begin the control of small fruit diseases is before the stock is secured.

Much valuable time may be saved, and productive stands of plants may be established for a longer life, if considerable attention is paid to the purchase of stock true to name and disease free, of a variety adapted to the locality chosen, and grown under conditions which result in vigorous plants. Such stock can usually be best secured from a nurseryman, specializing in the growing of small fruits. The initial cost of such stock is usually more than that of plants dug from a neighbor's patch. The chances are, however, that stock gotten from sources not examined regularly by officials of the state nursery inspection service will be diseased, often of mixed varieties, and thus expensive to plant, even if its first cost is nothing.

"Running Out" Due to Disease

It is true that some diseased nursery stock, raspberries in particular, has been gotten from nurseries. It has been only recently that the cause of the so-called "running out" of raspberries has been discovered. Careful investigations carried on by federal and state workers have definitely shown that raspberries are often infected with certain diseases which seriously injure the plant and decrease its production, or even cause its death. These diseases are known as bramble streak, leaf curl and mosaic, from the peculiar structural effects produced in infected plants. While the definite organisms causing the disease are not known, it has been shown that certain plant lice carry them from one plant to another while feeding. Through the hearty co-operation of nurserymen in general with inspectors of the nursery inspection service in the important raspberry producing states, this group of diseases is gradually being eradicated, through careful roguing out of the diseased plants in the nursery row. It will pay individual growers who find any plants infected with these systemic diseases in their own plantation either to rogue out the diseased plants or, if the number is considerable, to destroy the whole planting and start with clean stock.

Select Good Varieties

After the decision is made to buy of a reputable small fruit nurseryman who has clean, well-grown stock for sale, the next question is that of the variety to grow. A variety should be chosen with the following points in mind: adaptability to the locality, resistance to diseases, productivity and vigor of plants, and size and quality of fruit.

Disease resistance is fast becoming of great importance in varietal recommendation. A number of small fruits, such as the Quillen black raspberry, somewhat resistant to anthracnose, as well as the Wilder currant and Poorman gooseberry, not so subject to leaf spots as some other varieties, offer considerable encouragement in the breeding and selection of small fruits inherently vigorous and resistant to common troubles. Some kinds of raspberries, such as the purple cane, especially the Royal variety, appear to be better able to withstand the attack of crown gall than other sorts, especially if well mulched with strawy manure. The Royal is a vigorous grower and very productive, bearing crops of good quality fruit.

Since there is only a limited supply of the better varieties of small fruits, it is desirable to order early in the season from nurseries specializing in those sorts.

Plant in Clean Soil

In the selection of the locality for small fruit growing, there are a number of factors to be considered from the standpoint of the plant pathologist. For example, certain diseases, like anthracnose of the raspberry, are not so prevalent in some localities as others. The climatic conditions should be studied, and a choice of locality should be made with this information at hand. It is wise, also, to avoid a locality near small fruit plantations suffering from diseases, and which are being given no care, in order that the diseases shall not be spread. It is not safe to enter an area which has suffered much from diseases in the recent past, unless the infection has been thoroughly cleaned up.

In considering the site, choose land somewhat elevated from surrounding areas, to provide air and water drainage. Winter injury often results from the use of low, poorly drained land, even if the plants escape frost the previous season. Several diseases are more common, serious and difficult to control in low land.

The soil should be selected and handled with the end in view of growing vigorous and productive plants. It should be friable, full of humus and moderately fertile. Unless the soil is in proper tilth and filled with available plant nutrients, the plants become weak and thus they are subject to disease and climatic injury.

Give Room for Good Development

In setting the plants, the planting distances should be far enough apart to permit full development, consistent with ease and economy of soil management, pruning and spraying, especially as they refer to the control of diseases. For example, plants in rows but five feet apart (excepting strawberries) do not allow for the requirements as stated above, unless more pruning and training are given than is usually the case, to restrict the plants to narrow rows.

It has become good practice to remove the "handles" or old stems of the black raspberry after the young plants are set. Much of this old wood is infected with anthracnose. The removal of this infected wood helps materially in controlling the disease in the new planting.

Cultural methods need to be changed in many small fruit plantations. Pruning should be more severe as a rule, leaving fewer fruiting buds to develop. Though a smaller number of fruits will be produced, each fruit will be a trifle larger in size and usually of better quality, costing less per basket to pick and selling for a higher price. At the same time, the plant will not suffer such a severe drain and will remain more vigorous and less subject to disease than if it had been allowed to overbear.

Mulching Beneficial

It is under most conditions an excellent plan to mulch brambles and bush fruits. Straw, marsh hay or other moisture-conserving material, especially if it contains some animal manure, has been shown to increase the crop of fruit over 50 per cent and cut down expense in cultivating the plantation. If desired, this mulch may be applied only in the plant rows. The space between the rows may be cultivated. It is not wise to mulch grapevines, as a number of injurious diseases find hiding places in the mulch and are harder to control. Crown gall, so serious on the brambles, is essentially a cultural disease. It is spread rapidly in the soil through the soil water and cultivating tools. When deep cultivation is practiced and the tender roots of the susceptible host plants are broken off, the organism gains easy entrance and the

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ctice to re- d stems of the young of this old anthracnose. eted wood rolling the

g. d to be uit planta- ore severe iting buds- er number each fruit- size and osting less- ing for a time, the a severe vigorous- than if it-

ns an ex- bles and hay or material. e animal increase cent and ating the s mulch ant rows. may be o mulch injurious in the control. e bram- disease. through tools. practiced ceptible e organ- and the

plants become diseased. Where crown gall is present, the less deep cultivation the better. Mulching is preferable.

Sanitation in the small fruit plantation is, next to spraying, the most important single means of disease control after the plants are set. Burning over the strawberry patch during the renovation process to help control strawberry leaf spot, removing diseased canes at once from the plantation after pruning to aid in checking raspberry anthracnose, and keeping the ground clean about the vines in the vineyard to prevent the spread of black rot are cases in point.

Spraying is the most important single means of controlling small fruit diseases in the plantation. Used in connection with the other methods previously outlined, one can be sure of success in checking the spread of such small fruit troubles.

Spraying Recommendations

During the last few years, it has been pretty generally proved that the use of a delayed dormant spray of lime-sulphur, dormant strength, will effectively aid in the control of the common leaf spots of currants and gooseberries and anthracnose of the bramble fruits.

This spray should be carefully applied, covering every portion of the plant, as the leaflets are unfolding in early spring. A second spray about 10 days to two weeks later, of lime-sulphur, summer strength, will usually be of enough additional value to make it worth while. If the weather is hot and dry at this time it may be safer to substitute Bordeaux for lime-sulphur.

Grapes need thorough and consistent spraying if profitable crops are to be grown. The common grape diseases can usually be held in check by the following spray schedule: the first application just before the bloom appears, the second immediately after the fall of the bloom, followed by two others, applied 10 days and three weeks, respectively after the bloom. Such a schedule will usually be sufficient, even in a season of unusually severe fungous infection, to keep the vines clean. Bordeaux mixture should be used. The spray should be applied thoroughly, especially to the under sides of the leaves. In ordinary seasons, it will be necessary to apply only the first two sprays, that is, those just before and just after the bloom. By the addition of lead arsenate to the Bordeaux, a number of important insect pests may be controlled at the same time.

Removing Spray Residue From Fruit

IN VIEW of the interest which has been aroused by the spray residue question, the removal of residues from fruit is a subject of keen interest, especially in some parts of the country. In order to secure information on the subject, the Oregon Agricultural Experiment Station conducted an investigation. The results are reported in Station Bulletin 226, which has just been issued. The authors are R. H. Robinson and Henry Hartman. Copies of the bulletin can probably be obtained by growers in other states by addressing the experiment station at Corvallis, Ore. The summary of this bulletin is as follows:

1. The removal of spray residue by wiping and brushing has not been entirely satisfactory. No form of mechanical cleansing thus far tested out has proved effective under all conditions.

2. Mechanical cleansing has resulted in more or less injury to the fruit.

3. Mechanical cleansing devices, in some cases, may also aid in the spread of decay organisms.

4. Experiments with solvents have shown that certain acids and bases will remove spray residue in varying degrees of effectiveness.

5. It is apparent, however, that only a comparatively few compounds offer a possibility from a practical standpoint, and that under no condition can

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lighter shade of the body proper and the fenders handsomely set off by the darker tone of the upper body.

In the interior there is further evidence of costly quality, for Mohair Velvet is used for the upholstery, the steering wheel is of solid walnut, and the instrument board and window ledges are of walnut finish. Among many notable attractions included in its standard equipment are front bumpers, bumperettes, motometer, 4-wheel brakes, and 5 disc wheels.

And Nash has set the price so low as to be but little more than that of a Four or cheap Six. The Nash price range on 26 models is from \$865 to \$2090, f. o. b. factory.

(5366)

any solvent be used until an adequate storage test has demonstrated that no injury to the fruit results from its use.

6. Of the many compounds tested, none has proved to be superior to hydrochloric acid. This acid was found to be effective in removing not only arsenicals, but also such forms of residue as lead, copper and lime.

7. Hydrochloric acid has proved to be practically non-injurious to the fruit when properly used.

8. Other acids, such as nitric, acetic and sulphuric, while promising in some respects, have generally proved to be inferior to hydrochloric acid.

9. Although bases in general tend to remove spray residue, sodium hydroxide is the only basic compound discovered that successfully removed arsenate of lead under all conditions.

10. While this compound offers

some possibility, it has proved to be generally less desirable than hydrochloric acid. When used at ordinary temperatures and at the same concentrations, sodium hydroxide has been no more efficient than hydrochloric acid in the removal of arsenate of lead and has been ineffective in the removal of copper and lime.

11. The use of sodium hydroxide has resulted in more or less injury to the storage quality of the fruit.

12. The efficiency of solvents is affected by several factors, chief among which are: (1) the length of the treatment; (2) the concentration of the solution; (3) the temperature of the solution; (4) the maturity of the fruit; (5) the amount of agitation given; and (6) the spray program that has been followed.

13. The use of oil sprays along with the arsenate of lead apparently retards the action of the solvents,

but does not make cleaning by this method impossible, provided a sufficient amount of time elapses between the date of application of the oil and the date of treatment.

14. The use of "spreaders" or "deflocculants" apparently does not interfere materially with the action of the solvents.

15. It appears that any brand of arsenate of lead used as a spray can be effectively removed by the hydrochloric acid treatment.

16. The possibility of using a disinfectant along with the solvents is being investigated by the Oregon Experiment Station.

17. Fruit packed at various stages of wetness following the washing treatment has given varying results. A small amount of moisture appeared to do no harm in cases where the fruit to begin with was comparatively free from contamination and decay.



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every car, every road,
every purse.*



The Editor's Mail Box

Formula for Grafting Wax

Editor, AMERICAN FRUIT GROWER MAGAZINE: Please give me a formula for grafting wax.—W. W., Ohio.

ANSWER: There are many formulas for grafting wax. A very satisfactory wax is made from four pounds of resin, two pounds of beeswax and one pound of tallow. The resin should first be melted, then the beeswax should be added, and when this has melted, the tallow should be added. When the tallow lumps have melted, the mixture should be poured into cold water. After the mixture has cooled, it should be taken out of the water and worked until it is pliable and easily handled. The hands should be greased previous to handling the wax. A fairly mild, steady heat should be used in melting the ingredients, as too great heat may cause the materials to ignite.

The above should be regarded as a basic formula. When the grafting is done late in the spring when the weather is warm, the amount of resin should be increased. For grafting early in the season during cold weather, the proportion of tallow should be increased.

Many growers are now using brush wax instead of the heavier form. This is made of five pounds resin, one pound beeswax, one-fourth pint raw linseed oil and one-half pound lampblack or powdered charcoal. First melt the resin, then add the beeswax and melt it, and then add the linseed oil. Remove the mixture from the fire and add the lampblack, stirring in a little of it at a time to prevent boiling over. This mixture is quite inflammable and care should be taken in handling it. When the mixing is complete, the wax should be cooled, and it may then be used at once. A brush is used in applying it over the grafts.

Require Bank References

Editor, AMERICAN FRUIT GROWER MAGAZINE: Recently a Mr. —, claiming to be an expert horticulturist, appeared in our neighborhood. He stated he just wanted to show growers how to save their trees and how to prune and treat them. As soon as he looks at a tree he shows where and how it is diseased. He then offers to furnish a specific cure, consisting of a little red and white powder, and he offers to treat the trees free if growers will pay the cost of the powder, which is \$1.50 per tree. He charges nothing for his work. He digs a hole beside the tree, slits a piece of bark from the root and pores in the powder. He claims that in two or three minutes you can see a change in color in the tops of the branches.

I am sending a sample of this powder. Do you know anything about it? Can diseased trees be treated in this manner?

He also claims to have a superior grafting wax which costs \$14 a pound to make. He says he is giving all he makes except for personal expenses to charity. Where can I get the best grafting wax, and what is the cost?

Please advise me regarding the grafting of grape roots.—C. M. C., Florida.

ANSWER: My suggestion is that you and your neighbors leave Mr. —'s proposition alone. If any method of this kind were known, you can rest assured that the United States Department of Agriculture and experiment stations would know of it and would be advising growers regarding the same.

Methods of this kind have been proposed from time to time, but none has worked to date so far as I know. Several years ago when I was county agent in Union county, Illinois, a botanist in a small college proposed the theory that potassium cyanide injected into holes bored in a tree and corked in would be absorbed and would free the tree from insects and diseases, including San Jose scale. One of our best growers, against my advice, used the method and badly damaged a lot of young trees. He did not control the insects or diseases.

We have no means here for analyzing the powder you sent, but I think it is unnecessary to do so anyway. It is against good reason to expect such materials to be of help. If chemicals of this kind are very strong, they are practically certain to cause

the death of the delicate plant tissues. If they are so weak that they can be absorbed, they are quite likely to be changed in form as they meet the compounds within the tree.

Trees do not absorb salts in solution rapidly, and furthermore, such salts must be changed to proper forms in the leaves before they become fit for the plant. It is contrary to all knowledge of plant life to believe that the leaves would become greener within two or three minutes after salts were applied to the roots.

I would suggest also that you leave the grafting wax alone. The price you name is beyond all reason for grafting wax. You will find in another letter in this department formulas for grafting wax which can be made cheaply.

I suggest that you require Mr. — to identify himself to you and your neighbors beyond all doubt and to furnish bank references. If you would require these, I believe he will leave your neighborhood.

Regarding the grafting of grape cuttings, I suggest that you write to the United States Department of Agriculture, Washington, D. C., and ask for a copy of Farmers' Bulletin 471.

More About Jujubes

Editor's Note: Following the printing of the article on jujubes by W. B. Lanham in the January issue, we have received a great many requests for further information. It seems that many growers in states further north than Texas desire to know if this fruit can be grown in their localities, and they also want to know where trees can be purchased.

We addressed a letter recently to Prof. Lanham on this subject and the following reply was received from him.

EDITOR, AMERICAN FRUIT GROWER MAGAZINE: It is gratifying to know that the article on jujubes was of interest to your readers. I had a request from another paper for an article on the same subject, but I thought that your paper would reach more fruit growers, and this view is confirmed by the numerous requests I have been receiving.

Our knowledge of jujubes is confined to Texas, but in a general way, I doubt very much if they would grow where the temperature gets lower than zero. We are interested in it in particular because there is much land of this state in which many fruits do not succeed, either on account of lack of moisture or late frost. The jujube seems to thrive particularly well in these semi-arid districts, and as it does not bloom until a month later than other fruits, it is not injured by frost. Our trees have been secured from the Office of Foreign Seed and Plant Introduction, United States Department of Agriculture, Washington, D. C. The following nurserymen also list them in their catalogs:

Garree and Garree, Noble, Okla.
Austin Nursery, Austin, Tex.
Baker Brothers' Nursery, Ft. Worth, Tex.
Texas Nursery, Sherman, Tex.
Munson Nursery, Denison, Tex.
Foster Nursery, Denton, Tex.

Under separate cover I am mailing you a circular that has been issued from this station on jujubes.—W. B. Lanham, Texas Agricultural Experiment Station, College Station, Tex.

Lack of Vigor and Setting of Fruit in Sweet Cherries

Editor, AMERICAN FRUIT GROWER MAGAZINE: In 1914, I set out some Smidth Big and Black Tartarian cherry trees. They have not yielded over a gallon of fruit all told to the present time. I have fertilized them with chicken droppings and sulphate of ammonia every year. They look fairly well, but have not been making a large annual growth. Some of the fruit spurs have died and the trees have a very light bloom. Can you tell me what is the trouble and how to remedy it? The soil is a sandstone clay loam.—G. H. D., Ohio.

ANSWER: Your difficulty may be due to lack of sufficient fertility or cultivation. I think it would be advisable to follow a good fertility

program. You should be careful in using poultry droppings. They are very rich and are likely to damage the trees if used in too great quantity. Sulphate of ammonia or nitrate of soda should be helpful. I would suggest that for trees 15 years old you use about three or four pounds for each tree. Pulverize the fertilizer and spread it evenly over the ground under the branches where the feeding roots lie. There is no need of putting any fertilizer within about three feet of the trunks, as there are few feeding roots there. It is a good thing to work the fertilizer into the soil, though this is not entirely necessary, since the fertilizer will gradually be absorbed by the soil, provided rain does not wash it away.

It may be also that your trees need some cultivation. The fact that the fruit spurs have not been making a good growth indicates that your trees lack vigor. They can be made more vigorous by using more fertilizer and by cultivating more.

Failure of your trees to set fruit may be due in part to lack of proper cross-pollination. Practically all sweet cherry varieties are sterile to their own pollen, and many of them are sterile to the pollen of certain other varieties. We do not have in our files any records on the Smidth Big, but we do have records on the Black Tartarian. Experiments in California indicate that the best varieties of those tried for cross-pollinating this variety are the Advance, the Chapman, the Pontiac and the Bing. The Blackheart, Black Republican, Burbank, Lambert and Napoleon also give fairly good results in cross-pollinating this variety. I would suggest that you buy a couple of trees of other varieties and plant them near your present trees. When these come into bloom, you should have much better crops of fruit. For the immediate present, it might be a good thing to graft a few branches of your present trees to stock of a good cross-pollinating variety. When the grafts grow sufficiently to produce blossoms, this should also correct your difficulty. For the next year or two you can probably get some worth while results by securing some fairly large limbs of a pollinating variety just previous to the blooming season and placing these in vessels of water suspended in your trees. These should bloom at about the same time as your trees and will then bring about the necessary cross-pollination. This method has proved helpful in many places.

Crown Gall and Canker Worms

Editor, AMERICAN FRUIT GROWER MAGAZINE: Will crown gall on raspberries be transmitted to apple trees if the raspberries are planted between the rows of apple trees?

Will Tanglefoot prevent canker worms from destroying trees? Is it injurious to the trees?—J. F. B., Pennsylvania.

ANSWER: Crown gall attacks a large number of fruit plants, including raspberries and apple trees. The same organism attacks both of these plants.

Under the circumstances, it would be inadvisable to plant between apple trees raspberry plants which are infected with crown gall. I should not plant in any place raspberry plants infected with crown gall. Of course, if you should take extreme care to get disease free plants from reliable sources, you could plant them between the apples with a reasonable degree of safety.

Tanglefoot would help materially to prevent infestation of trees by canker worms. Such barriers should be applied in late February or during March, that is, before the canker worms begin to move. Another effective barrier is a band of cotton batting several inches wide tied tightly around the trunk with string near the bottom edge and the upper edge turned down over the lower to form an inverted funnel-shaped barrier.

Compatibility of Spray Materials

Editor, AMERICAN FRUIT GROWER MAGAZINE: I understand that certain spray materials cannot be mixed together without danger of injuring the foliage. I should appreciate it if you will tell me what you can about this matter so that I may avoid possible damage to my trees and fruit.—R. E. L., Michigan.

ANSWER: You are correct in believing that certain spray materials cannot be combined without danger of damaging the foliage and fruit. The most condensed information that I know of on this subject is contained in Bulletin 94 of the Virginia Agricultural and Mechanical College. The following is taken from this bulletin:

Bordeaux Mixture.—Safe with basic and neutral lead arsenate, calcium arsenate, Paris green, nicotine sulphate.

Dangerous with oil emulsions. Doubtful with soaps.

Sulphur.—Safe with basic and neutral lead arsenate, calcium arsenate, Paris green, nicotine sulphate, soaps, oil emulsions.

Alkali Sulphides.—Safe with oil emulsions, soaps, nicotine sulphate.

Dangerous with Paris green, calcium arsenate, acid lead arsenate.

Doubtful with basic and neutral lead arsenate.

Lime-Sulphur.—Safe with acid lead arsenate, basic and neutral lead arsenate, calcium arsenate, nicotine sulphate.

Dangerous with Paris green, soaps.

Oil Emulsion.—Safe with alkali sulphides, sulphur, basic and neutral lead arsenate.

Dangerous with Bordeaux mixture, acid lead arsenate, calcium arsenate, Paris green.

Soaps.—Safe with alkali sulphides, sulphur, basic and neutral lead arsenate, nicotine sulphate.

Dangerous with lime-sulphur, calcium arsenate, Paris green.

Doubtful with Bordeaux, acid lead arsenate.

Nicotine Sulphate.—Safe with soaps, lime-sulphur, alkali sulphides, sulphur, Bordeaux, acid lead arsenate, basic and neutral lead arsenate, calcium arsenate.

Paris Green.—Safe with Bordeaux, sulphur.

Dangerous with alkali sulphides, lime-sulphur, oil emulsions, soaps.

Calcium Arsenate.—Safe with Bordeaux, sulphur, lime-sulphur, nicotine sulphate.

Dangerous with alkali sulphides, oil emulsions, soaps.

Basic and Neutral Lead Arsenate.—Safe with Bordeaux, sulphur, lime-sulphur, oil emulsions, soaps, nicotine sulphate.

Doubtful with alkali sulphides.

Acid Lead Arsenate.—Safe with sulphur, lime-sulphur, nicotine sulphate.

Dangerous with alkali sulphides, oil emulsions.

Doubtful with soaps.

Killing Poison Ivy

Editor, AMERICAN FRUIT GROWER MAGAZINE: I noticed in the February issue a formula for poisoning undesirable growth. Could this method be used on poison ivy with effective results?

Is the Douglas pear as blight proof and as early a bearer of high quality fruit as one nurseryman advertises it to be?

How about the Lincoln pear?

Is the Caco grape hardy and a consistent bearer?—H. B., Indiana.

ANSWER: Regarding poison ivy, you can kill this very readily by spraying it with arsenite of soda, one pound to five gallons of water. It is a good thing to soak the soil at the base of the vines in order to reach the roots. More than one treatment may be necessary if the vines are large and vigorous.

The Douglas pear belongs to the Kieffer class and "is better in flavor than any other variety of its class." The trees begin to bear early and are as productive as Kieffer trees, though they are not as vigorous and do not become as large. The trees often overbear, and the fruits in that case tend

to be small. In sections where the Kieffer is grown, the Douglas is well worth trying.

The Lincoln pear is an old variety, but in recent years it has been brought to the front in the Middle West. It does not seem to be in high favor in New York, but in Illinois and Missouri the fruits are regarded by many as good in quality and appearance. The Lincoln seems to have a strong constitution and therefore can stand the extremes of heat and cold that occur in the Middle West, and the variety is also fairly resistant to pear blight. Some persons claim the fruits are comparable to those of the Bartlett. This variety is worth trying, at least, by growers in the Middle West.

A report on the Caco grape was made by the Ohio Agricultural Experiment Station in Bulletin 391, issued in February, 1926. According to this station, the Caco is a new variety of promise. It has been conspicuous among the 112 varieties tested in the station vineyards. The vines are vigorous growers, hardy and productive, and the fruit is of high quality and

attractive in appearance. The fruit ripens a little earlier than that of the Concord. The clusters are of medium size and inclined to be compact. The berries are large, round and of amber-red color, covered with a wax of attractive appearance. The skin is thick and tender and parts readily from the flesh. The flesh is firm, juicy and tender, and the flavor is sweet, rich and aromatic. The variety is said to be self-fertile. In the Ohio station vineyards, the Concord yielded 4.8 tons to the acre on the average for the years 1922-24, while the yield of the Caco was 3.2 tons.

Says Fruit Grower Is Worth \$5 a Year

Editor, AMERICAN FRUIT GROWER MAGAZINE: Have just been looking over my old copies of the AMERICAN FRUIT GROWER MAGAZINE trying to locate a description of a machine I saw advertised some time ago. It certainly pays one to go over the old copies, for there is such a wealth of information in them for anyone deeply interested in fruit growing. I do wish you

could use a better class of paper so that you could get clearer photographs. This would no doubt cost more money, but I consider the class of material you are printing is cheap to a fruit grower at \$5 a year. Why not put it up to your subscribers?—S. B. H., Canada.

EDITOR'S NOTE: We are glad to know that S. B. H. considers the AMERICAN FRUIT GROWER MAGAZINE worth \$5 a year to him. Of course, we should not object if our readers would bury us under an avalanche of five-dollar bills. Gentlemen, the question is before you! What are you going to do about it?

An old countryman, who had been to London for the first time on business, returned in a bad temper.

"At that hotel," he complained, "they kept the light in my bedroom burning all night. I couldn't get a wink of sleep."

"Why didn't you blow it out?" asked his wife.

"Blow it out?" said the old man. "I couldn't. It was in a bottle!"—Pearson's.



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The Young Generation and the Tractor

A FEW years ago only a handful of tractors in the land—today over a half million! The children of today are growing up in the power farming age. The McCormick-Deering Tractor in the field, the family automobile on the road—and life on the farm holds more living than ever before.

Necessity and the spirit of youth have brought about great changes on the farms. The young farmer and the older farmer who keeps his mind young are working on the new and profitable scale. They are making money by handling the most productive work in the least time with the lowest

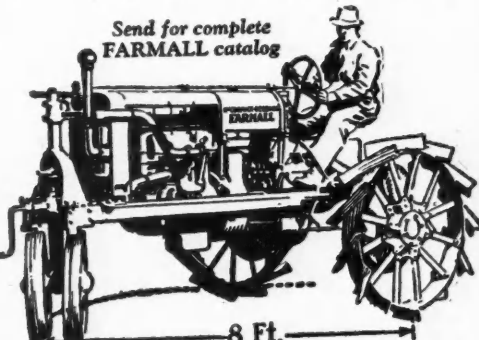
labor costs. They are increasing per-acre yields—plowing more furrows per trip—planting every hill full—cultivating more rows—cutting wider swaths. They are beating down the high price of labor by making that labor do two and three days' work in one, and that method leads to farm profit.

The tractorless farmer is working against fearful odds these days—against the fast, productive work of six hundred thousand tractors. This spring more of the high-quality tractors—McCormick-Deering 10-20, 15-30 and FARMALL—are going from the McCormick-Deering dealers to work on the farms than in any previous spring.

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THE FARMALL

The remarkable new 4-cylinder McCormick-Deering FARMALL, designed to handle planting and cultivating of row crops, as well as all other farm power work. With a 2-row planter the FARMALL covers 25 to 30 acres a day; with a 4-row planter 50 acres a day. Equipped with cultivating attachment, FARMALL cultivates 15 to 25 acres a day, doing the work of 2 or 3 men and 6 to 8 horses. In all haying operations, too, nothing can beat FARMALL. With the 7-ft. mowing attachment and one 7-ft. trailer mower you can cut 50 to 60 acres a day.



This view shows the short-turning radius of the new FARMALL.

McCORMICK-DEERING

Tree Growth and Fruit Production

By Joseph Oskamp
Cornell University

DESPITE the fact that horticulture has made rapid progress in recent years, there are still many things to learn. The surface of the body of knowledge has barely been touched. We still must accept many things on faith rather than as the result of conclusive experimental proof. While even pomologists themselves are not fully in accord as to certain points, yet there are some facts which have been so repeatedly

growth is closely related to satisfactory production, and that satisfactory production is dependent upon good growth, is a distinct step in advance. A recognition of this fact at once simplifies our teaching in pomology. We still recognize, of course, that a heavy crop will generally reduce growth during that year, and to this extent production might be said to be antagonistic to growth. But we now understand quite thoroughly the limits in this direction. The question might well be asked, "How is this relationship between the growth of apple trees and the amount and quality of fruit borne, brought about?"

Providing for New Fruit Spurs

The growth on the ends of the branches which is made during each summer over the entire top of a fruit tree is commonly referred to as terminal growth. The terminal growth is nothing more than the twigs which grew during the last spring and summer. These twigs, of course, have lateral buds spaced along the twigs and terminal buds at the end, and they pass the winter in that condition. When spring comes, these buds open up. The terminal bud and two or three of the buds closest to the terminal will generally form another set of terminal growths or twigs, and the buds below will make very short growths, often less than one inch long, which are commonly referred to as spurs.

Here, then, is the beginning of a new fruit spur system and the number of these spurs which will be formed in any one year is dependent upon the number of buds on the terminal growth and hence upon the length of the terminal growth. The buds are located at rather regular intervals along the twigs, and if the twig is as much as a foot in length, there will be a large number of lateral buds, and consequently a large number of fruit spurs can develop. If the terminal growth, on the other hand, is only an inch or so long, there will be very few lateral buds, and furthermore, in such a case, the spurs produced are generally weak and often fail to form blossom buds. Fruit spurs are thus formed the second summer on what was the terminal growth the year before. Some of these spurs during that summer will actually form blossom buds which during the third summer will develop into flowers and mature fruit. These are the youngest fruit spurs on a tree, and this type of fruiting is often referred to as "fruiting from two-year-old wood."

Figure 1.—Terminal branches from a vigorous and a weak apple tree of the same variety

The vigorous left branch has made more growth in two seasons than the weak right branch has made in four seasons. The stockier branch with the longer terminal growth shows a large number of opening blossom buds from spurs from the two-year-old wood. This marks the beginning of a new fruit spur system and is the type of growth to encourage. The slow growing lateral branch on the right shows a very poor development of spurs and no blossom bud formation, characteristic of the condition found in orchards receiving poor care.

demonstrated by experiments that belief in them is almost unanimous.

One of these facts about which pomologists are pretty well agreed is the close relationship between tree growth and fruit production. If all the experimental results recording the growth and production of fruit trees during the last 20 years were summarized, it would be found uniformly true that those trees or those plots which showed the best growth, due to whatever practice employed, also showed the best production, both in quantity and quality of product. This is a comparatively new thought.

Satisfactory Production Dependent Upon Good Growth

It was not many years ago that growth and production were looked upon as antagonistic features. Growth was supposed to be peculiarly a vegetative function of the tree which was directly opposed to fruitfulness, and those factors which were favorable to fruitfulness were supposed to inhibit growth. Hence the notion that to seed the young orchard to grass would bring it into bearing more quickly than if it were cultivated. Various other equally absurd notions along this line were quite prevalent. The recognition of the fact that good

It has been shown by experiment that fruit spurs do not continue to be productive for very many years. They appear to do their best during the first few years, and after they are seven or eight years old, they rapidly begin to weaken and blossom only occasionally or not at all. By maintaining longer terminal growth in a fruit tree, new fruit spurs are adequately provided for the future. With a new crop of spurs coming on each year, the bearing habit is steadied to some extent, and the quality of the fruit is improved. The fruit from these younger spurs will usually be of a larger size and of better color and finish than the fruit from old spurs.

Rejuvenation of Older Fruit Spurs

If profitable crops are to be produced, it is not only important to provide for new fruit spurs, but it is also necessary to bring about a better

That is, there is a tendency for the same conditions which promote blossom bud formation in the older spurs to influence the other spurs on the tree in much the same way, and it is to this fact that we sometimes owe a bumper crop. However, if such conditions are provided as to cause the trees to make a vigorous terminal growth, together with a vigorous growth of older fruit spurs, we are doing probably all that we can do to discourage biennial bearing.

In bringing about a longer growth of the older spurs, we are making conditions more favorable for fruit bud formation and the setting of fruit among some of these spurs. It is quite impossible to set any definite length for a spur, but as a rule, when the growth of what has been a spur attains the length of over three inches, it is to be considered in the twig or terminal class. It so happens that the food available for any individual spur is pretty largely produced by the leaves which are attached to that particular spur. If the spur is very short, it necessarily has but a

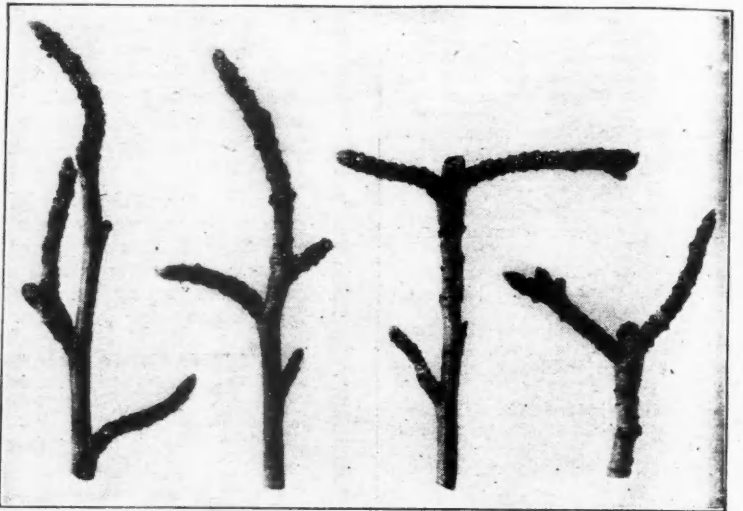


Figure 2.—Fruit spurs from an apple tree of low vigor

The growth of the spurs has been very short most years, which is indicated by the space between the prominent ridges which marks the length of a season's growth. All of these spurs are over seven years old. None of the spurs shows indications of blossoming this year, and only the first, second and fourth spurs show scars where fruit has been borne in the past. This is characteristic of wood from an unprofitable orchard. Compare with Figure 3.

growth in the older spurs, for the production of a normal crop of apples is dependent to quite a large extent upon the blossoming and the set of fruit on the older spurs. It is these older spurs throughout the entire tree which usually produce the main part of the crop and with which the younger spurs often act in unison.

few leaves. If it is as much as an inch long, it may have six or eight leaves. This larger leaf surface is important in determining the character of the bud which will finally be produced at the end of the spur. A long spur with a large leaf surface means a better fed spur, and a better fed spur means that the chances are greatly improved for that spur forming a blossom bud and actually setting fruit. Furthermore, the fruit on such a spur is usually larger and of better quality. Thus, through the increased set of those spurs which blossom, as large a crop may be produced when the tree is blossoming lightly as might be produced if the tree were blossoming to the extent of 90 per cent of the spurs. The lighter blossoming will tend, as far as it is now known to be possible, to steady yields and avoid to some degree biennial bearing. At the present time, however, we know of no sure way of causing trees which are persistently biennial, to become annually fruitful in habit.

Indications of Satisfactory Growth

Satisfactory growth is, of course, a relative term. It is not practical to lay down any hard and fast rules as to the proper length of terminals or fruit spurs for any of our fruits at the present time. In a general way, a terminal growth of six inches to a foot would be considered satisfactory for apples, while the growth of the fruit spurs might vary all the way from a quarter of an inch to two or three inches in length, depending upon the



Figure 3.—Fruit spurs from a vigorous tree of the same variety as shown in Figure 2. These spurs are making a satisfactory growth. The large scars about mid-way of each spur are where the fruit was borne last year. Blossom buds are unfolding from these same spurs this year. It is not usual for the same spurs to blossom thus two years in succession, and only vigorous spurs will occasionally do this. These spurs are from three and four-year-old wood, and are the type of spur that means a successful orchard.

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season, the variety, the soil and other conditions. The amount and color of the foliage is a very delicate criterion of the vigor of the tree and the growth that it is making. The leaves of a tree making a satisfactory growth are usually more numerous, larger, and of a darker green color. The leaves hang on the tree until killed by freezing weather in the fall.

The orchard making a poor growth with unsatisfactory production is just the reverse of the above. The terminal growth is often less than an inch long. The spurs may scarcely be making a perceptible growth. The leaves are rather sparse, small in size, and pale green or yellow in color. Leaf fall often occurs early in August or September. Such trees occasionally blossom profusely, but the spurs make so little growth and have so few leaves that very few blossoms set. Associated with such weak growth are poor crops of low quality, under-sized fruit.

Pedigreed Nursery Stock

By U. P. Hedrick

New York Agricultural Experiment Station

AN ATTEMPT is being made to attach importance to the pedigrees of plants which are propagated from buds, scions, cuttings and offshoots. It is claimed that varieties of fruits should have their lineage set forth before they find a place in the plantations of up-to-date planters. My own belief is that there is little of value in the ideas of those who would have nursery stock sold with a pedigree, or attempt to improve fruit trees by bud selection.

The weight of scientific authority is against the theory that varieties propagated from cuttings either improve or degenerate. Science very generally accepts the belief that "in vegetative reproduction, heredity is complete." The discoveries associated with the name of Mendel, emphasize the fundamental nature of the great force of heredity in determining the characters of living things. "Like begets like," "Race is everything," "A chip off the old block," "Like father like son," are old and familiar sayings, recalling the general nature of heredity which present knowledge makes more forceful than ever before. But new characters may get in and in their turn are inherited. How? The touchstone which Nature uses in introducing new characters into living things is the phenomenon long familiar to fruit growing as "sporting," which scientists dignify with the name "mutation," in which new characters in animals and plants are produced from existing forms by sudden leaps.

Selection as a means of improving plants is, we believe, either a worthless, a very limited, or at best a very cumbersome method of improving plants. Most of the differences in plants within the same variety or species are not transmitted from parent to offspring, and, therefore, selection is of little avail. There are, however, two kinds of variations.

Suppose a branch of russeted, or red apples in a tree of green apples; or a cane bearing white, or red, or seedless grapes on a Black Hamburg vine; or a branch of a Montmorency cherry bearing double flowers, to represent the kind of variations that may come true when propagated from buds or scions. Such variations are relatively rare, and when found, whether or not the new character can be transmitted to the next generation, can be determined only by trial. There are variations of another kind due to richer soil, more sunlight, better care, which, the more pronounced, the more vigorous is the plant, the more fruit it produces and the larger and the more perfect is the fruit. But though these conditions produce a direct effect upon the plant during its lifetime, there is no evidence to show that variations so brought about can be transmitted from parent to offspring. The fruit grower who wants to perpetuate such variations, must renew for each generation the conditions which gave him the desirable effects.

To summarize: to be of any value in plant improvement, a variation must be inheritable. Fluctuating variations in vigor, hardness and size of plant, and in color, size, amount and quality of fruit due to environment, are not inheritable. Evolution was formerly considered a continuous and a cumulative process; the revised theory is that it is a discontinuous process and new characters are added in one leap. Somehow, somewhere, some time in the life of a species of plants, a wholly new character is added, or removed, and the variation is transmissible to the succeeding generation. May it not be true that size of fruit, vigor, hardness or productiveness of plant may appear as mutations and be heritable? These characters may appear as heritable variations, but it cannot be known without precise experiments for each case whether or not they will be inherited. No fruit grower or nurseryman is warranted in assuming that the qualities named can be handed down or not; the chances are many to one that such variations are due to environment and are not transmissible.—Extract from

paper presented at annual convention of Indiana Horticultural Society.

Encouraging Planting of Walnuts

THE NORTHERN Nut Growers' Association is encouraging the planting of nut trees on Arbor Day. The black walnut is particularly valuable for planting, according to the association. The kernels are an excellent food and sell at 50 cents to \$1 a pound wholesale. There is now a strong demand for the kernels and the supply is insufficient to meet the demand from bakeries, candy makers, etc.

In a search conducted last fall, the association located a number of walnut trees of exceptional merit. These are now being propagated by budding and grafting. Some of them, it is said, have kernels of good shape and which come out of the shells readily in whole halves or quarters.

The wood of the walnut is also valuable. Even the stumps are being dug up in many places and made into veneers. An acre of mature black

walnut trees has a sale value in many sections equal to the value of the land. In view of the extensive cutting of timber, it is inevitable that prices for lumber must rise, and many authorities are recommending the planting of black walnuts for timber alone.

Promoting Horticulture in Ohio

THE OHIO State Horticultural Society is promoting larger development of the horticultural activities of the state. The legislature is being asked for \$10,000 a year to pay the salaries of extension workers. For general instruction work in horticulture at the state university, \$25,000 yearly is being asked, and \$60,000 a year is being asked for the construction of greenhouses.

A committee consisting of members from each important horticultural interest is promoting this project. The committee has compiled figures showing that the horticultural interests of Ohio are of sufficient importance to justify such a program.



50 miles per hour



5^{to} 25 miles in 8 seconds



25 miles to the gallon

The only full-sized car in the world **\$750** that gives these values at this low price -

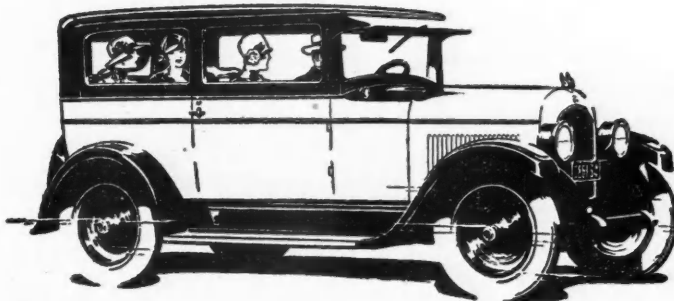
Full-Sized, Sturdy Construction With Ample Seating Capacity For 5 Adult Passengers. Mohair plush upholstery. Chrysler smartness and beauty of line and color. Full balloon tires. Low-swung bodies. Special spring front engine mounting.

Coupe, \$750; Coach, \$780; Roadster (with rumble seat), \$795; Sedan, \$830; Landau Sedan, \$885. All prices f. o. b. Detroit, subject to current Federal excise tax.

All Chrysler dealers are in position to extend the convenience of time payments. Ask about Chrysler's attractive plan.



The overwhelming superiority of the full-sized Chrysler "50" at its amazingly low price are important reasons why Chrysler has been thrust ahead from 27th to 4th place in the short period of three years.



CHRYSLER "50"

Better Flavor



Nitrogen gives fruits an attractive color and a savory taste. Such fruits bring top prices in every market. One tart apple—"worth eating"—will outsell six of the insipid fruits. Make sure of a bumper crop this season and an active profitable market. Apply

CALCIUM NITRATE (NITRATE OF LIME)

This form of nitrate fertilizer is

Guaranteed to contain a minimum of 15 per cent Nitrogen—18.2 per cent Ammonia



Combined with 28 per cent of water soluble, immediately available Lime.

The nitrogen insures rapid growth, color and flavor, and the lime makes fruit firm and plump and gives it good keeping qualities. Our free literature gives you complete details of our nitrogen fertilizer. Send for it. If your dealer doesn't carry our products, write us his name and address. We will see that he is supplied.

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Markets and Marketing



BECAUSE everybody uses the postal facilities, the government can maintain a first-class service and deliver a letter anywhere in the United States for as little as two cents.

To send a Christmas card to each of the 3646 wholesale fruit buyers in the country would be a simple task for anyone having an accurate list of their addresses.

But if 3646 greeting cards were divided among 10 people and each addressed and mailed his cards without direction or consultation with the others, some buyers would probably receive 10 cards and many would certainly receive none.

The same thing happens in an agricultural industry when a number of marketing agencies each attempt to independently distribute a portion of a perishable crop without knowing the plans of the others. While some markets are undersupplied, the others are unintentionally overloaded. In either case the producer suffers.

It is not the fault of the shippers—it is due to the "blind man's buff" method and the absence of a system for correlating all shipments.

The only way the citrus growers of California can realize the maximum returns on their fruit is by distributing all of the crop through one central organization.

Fortunately, in the California Fruit Growers' Exchange, California citrus growers have such an agency, founded 33 years ago for this very purpose. The fruit of 201 local packing associations is now intelligently distributed through this central organization. Thus 75 per cent of the crop is marketed in an orderly way.

The exchange systematizes distribution but encourages competition in production. The exchange grower who produces a superior grade of fruit, or the exchange association that turns out a better pack is rewarded by the premium price to which he, or it, is entitled. Each gets whatever the fruit will bring, less only the actual cost of selling.

Eleven thousand growers, three out of every four in the state, have found this method most profitable.

They confidently believe that all growers will profit as a larger share of the California crop is marketed through the exchange.

And that with the exchange, as with the postal service, increased use means even better service at even lower cost.—The Sunkist Courier.

GREAT strides have been made in the past three years in the development and installation of precooling plants throughout Florida. The large percentage of this development, which is so important for the protection and better marketing of fruit, has been done by the Florida Citrus Exchange. The value of precooling is known to practically all citrus men and therefore needs no lengthy explanation.

There were only two precooling plants in Florida in the season of 1920-21. One was located at Orlando and owned by the A. J. Nye Company, and the other was owned by the Winter Park Fruit Company, located at Winter Park. The combined capacity of these two plants totaled only 12 cars in 24 hours. Both plants were owned by shippers competitive to the exchange, but the Winter Park Fruit Company allowed exchange growers to use their plant.

Today there are a total of 19 precooling plants in the state. Of this number, the exchange owns 13 plants while six are operated by independent

shippers. Of the six independent precooling plants, only three are used for citrus, the other three being vegetable precoolers. Twelve of the exchange plants are for citrus precooling, and only one is used for vegetables.

A better picture can be had of the situation by comparison of the car capacity. The total daily capacity of the 19 precoolers is 120 cars. Of this number the exchange controls 82 cars, or 67 per cent. Seventy of the 82 cars are used for citrus precooling, while only 12 cars are used by the exchange for vegetables. Independent shippers control 38 cars, or 33 per cent. Of these 38 cars, only 15 are used for citrus, while 23 cars are given over to the use of vegetables. Thus the exchange is operating twice as many precooling plants for its growers as all of the independent shippers combined.

Following is a list of precooling plants in operation today, showing car capacity, location of plants, number of cars used, citrus and vegetables:

Location.	Organization.	Product.	Capacity.
Florence Villa.....	Florida Citrus Exchange	Citrus	12
Tavares	Florida Citrus Exchange	Citrus	5
Arcadia	Florida Citrus Exchange	Citrus	10
Kissimmee	Florida Citrus Exchange	Citrus	5
Mt. Dora.....	Florida Citrus Exchange	Citrus	6
Winter Garden.....	Florida Citrus Exchange	Citrus	6
Tildenville	Florida Citrus Exchange	Citrus	5
Cocoa	Florida Citrus Exchange	Citrus	4
Oak Hill.....	Florida Citrus Exchange	Citrus	4
Pt. Pierce.....	Florida Citrus Exchange	Citrus	4
Plymouth	Florida Citrus Exchange	Citrus	4
Winter Park.....	Florida Citrus Exchange	Citrus	5
Sanford	Florida Citrus Exchange	Vegetable	12
Orlando	A. J. Nye & Co.	Citrus	7
Nocera	Wells Fruit Co.	Citrus	4
Isleworth	Chase & Co.	Citrus	4
Sanford	Fox combination precooler	Mostly vegetable	8
Sanford	Co-operative Association	Vegetable	10
Winter Garden.....	M. C. Britt	Vegetable	5

From this brief of the precooling situation in the state, it is evident that the Florida Citrus Exchange deserves great credit, not only for making this essential feature in the marketing of fruit available to its growers, but also for taking such definite leadership in the improvement of the industry.

THE BOSTON Market Terminal Company and the New York, New Haven and Hartford Railroad Company have recently announced the completion of the new wholesale produce market, which is served by the New Haven road.

The provisions include two large brick houses, each 660 feet long and 50 feet wide and having a capacity of 75 carloads, and a bulk yard with a capacity of 200 carloads adjacent to the market houses for direct railroad delivery. Between the two houses, there are three covered platforms and four railroad tracks. The terminal was occupied on March 1.

Original plans provided for the erection of a new Boston auction close to the new terminal market, but it now appears that the offer of the Boston and Maine Railroad to build a \$350,000 auction shed 1 near the Rutherford Avenue yards will be accepted. This building will be modern in every respect and will be ready for occupancy about July 1.

A COMMITTEE of New York grape growers visited southwestern Michigan a short time ago to determine, if possible, why Michigan Concord grapes brought \$3 a ton more than Concord grapes from the Chautauqua section of New York last fall. After a detailed inspection of the vineyards and of the marketing methods employed, the committee reached the conclusion that the higher price was

probably due to the influence of the Michigan grape grading law. Grading of grapes is compulsory in Michigan, and during the marketing season the state department of agriculture maintains inspectors in the growing districts who carefully inspect every car of fruit.

Besides making a field inspection, the committee visited Lansing and had a conference with the state officials in charge of the standardization laws.

The committee included the following: R. R. Pelton, manager of the Keystone Grape Association, North East, Pa.; Walter Stebbins, director of the South Shore Growers' and Shippers' Associations, Silver Creek, N. Y.; F. M. Cockrum, F. B. Birdsey, George Pellet and C. R. Cunningham, directors of the Chautauqua and Erie Grape Growers' Association, Westfield, N. Y.

THE YAKIMA irrigation district in Washington produced the largest total tonnage and highest value of apples, and showed the largest yield per acre, of all the federal irrigation projects in the United States in 1926. Commissioner Elwood Mead announced recently. It ran nearly 500 per cent ahead of its nearest competitor, the Okanogan project, which also is in Washington. Yakima had 15,400 acres in apples last year and produced 190,000,000 pounds valued at \$1,901,000. Its yield per acre was 12,302 pounds, or 801 pounds more than on the Okanogan, which had 3708 acres producing 42,600,000 pounds valued at

\$473,000. In value per acre, however, the Okanogan surpassed the Yakima in the proportion of \$127 to \$123. Other apple growing irrigated districts produced 1400 to 5000 pounds per acre.

A check on Yakima storage holdings February 1 indicated that Yakima's 1926 apple crop would measure up fully to the early prediction of 14,000 carloads. Shipments to that date totaled 10,016 carloads, and cold and common storage totaled 3954 carloads. This was 965 cars less than last year at the same time.—G. N. Angell, Oregon.

OVER 80 per cent of the grape shipping firms of California used the federal state inspection service last season. The majority of those who did not use the service were small operators. All of the leading operators used the service extensively, many of them giving blanket orders for the inspection of all juice grape shipments handled.

A BILL is before the Massachusetts state legislature which proposes to give the commissioner of agriculture authority to establish grades and standards for farm products. The use of the proposed law is to be voluntary. One of the objects of the bill is to make it possible for Massachusetts products to compete more effectively with graded products from other sections.

ACCORDING to a recent decision of the Bureau of Agricultural Economics, reassembled cars of products must be reinspected before certificates can be issued, even though the original lots were inspected previously. This step is considered advisable because of the fact that small lots of inferior products sometimes become

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because resorting sometimes takes
place during reassembling in order to
remove rots and other defects. The
reassembled lot of products is not
the same as the original lots, and a
new inspection is therefore necessary
in regard to both quality and condi-
tion.

"EVERY market is in a perpetual
state of change. Based upon
census reports, each year 2,500,000
new born Americans begin consum-
ing; 400,000 graduate from high
schools and 100,000 are leaving col-
leges and universities and entering
upon their careers. One and a quar-
ter million brides start housekeeping
and the same number of grooms start
spending their incomes in new ways
—1,400,000 people die yearly—and an
almost equal number lose their pro-
ductive capacity.

"Thus in a few years a market may
become entirely new, and it may move
beyond the influence of the good will
previously obtained for a product.
The need of continuously informing
the public on its products has been
recognized by the California Fruit
Growers' Exchange, which is enter-
ing upon its twentieth season of na-
tional advertising.

"The exchange has been a pioneer
in applying advertising and merchan-
dising work with the trade in the mar-
keting of a fresh fruit product, and as
a pioneer in this field, the exchange
enjoys an enviable position with both
consumer and trade.

"The exchange investment in na-
tional advertising represents an ex-
penditure of approximately three-
fourths of one per cent of the gross
sales, or one-fourth to two-fifths of
a cent per dozen. The exchange
spends less than one cent per consum-
er to advertise and merchandise its
products.

"During the past 19 years the total
orange and grapefruit supply has
practically trebled; the California
supply has increased 70 per cent
while the population has increased
only 33.7 per cent. This increased
supply has been consumed without a
corresponding decrease in price levels
to the producer, which would have
inevitably followed if consumer de-
mand remained static.

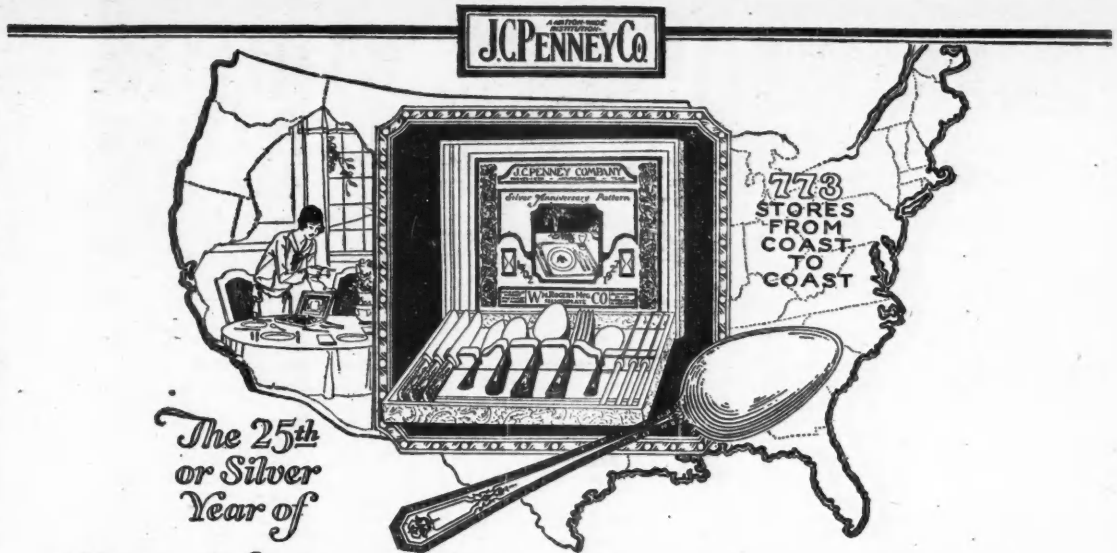
"From the season 1903-04 to and
including 1925-26, the total United
States supply of lemons has increased
106 per cent while the California sup-
ply has increased 551 per cent. The
increase in population during this
24-year period has been 43.4 per cent.
During the past five years the per
capita consumption has increased
three and one-half lemons."—Extract
from annual report of California Fruit
Growers' Exchange.

Monthly Market Review

THE FOLLOWING summary of the
fruit marketing situation was fur-
nished by the United States Bureau of
Agricultural Economics on March 10:

"The spring season opens with a
rising tendency in the produce mar-
kets, although supplies continue to be
liberal. Various lines of stored prod-
ucts have been clearing up fairly well
and general consuming demand has
been good. Shipments have been com-
ing about 10 per cent heavier this
spring than in the spring of 1926 with
its backwardness, weather damage and
light stock in storage. All these con-
ditions are somewhat more favorable
to activity in trade the present season.
Old crops were greater and the new
ones larger and earlier. There is a
general increase all along the line of
carlot receipts and naturally some ef-
fect is seen in lower prices for many
of the leading fruits and vegetables
as compared with last season.

"Recently there has appeared a
rather general tendency to higher
prices compared with the winter de-
pression. The slightly rising tendency
of potatoes, cabbage, apples and onions
in early March was cheerful news to
holders. The good demand seems to
be the real basis of these gains. Gen-
eral business conditions have contin-
ued active in most lines and consum-



This Nation-Wide Shopping Service
To Be Signalized — Starting April 1st — by
Extraordinary Memento Offerings

FOR a quarter of a century the
J. C. Penney Company Department
Stores have been solving the shopping
problems of American families through
utilizing their tremendous cooperative
buying and selective power.

Our great buying advantages and cash
purchases save millions of dollars every year. These
important savings are passed on to our cus-
tomers in better quality at lower prices.

The J. C. Penney Company has become a
household word thruout the United States for
quality in General Dry Goods, Outer Apparel,
Millinery, Corsets, Dress Accessories, Clothing,
Hats, Furnishings, Footwear for the entire
family, also well-known Notions at 4c. and 8c.

Some of our own Nationally-known brands
and values: Lady-Lyke Corsets, 445 and 449 Full-Fashioned
Silk Hosiery, Honor Muslin, Penco Sheets and Sheetings,
Ramona Cloth, Pay-Day Overalls and Work Shirts, Nation-
Wide Work Suits, Big Mac Work Shirts, Marathon Hats, the
famous J. C. Penney Company Shoes and other brands.

The convenient location of our 773 Stores, distributed over
46 States, gives everyone the advantage and pleasure to be
had from personal selection. If there is not a J. C. Penney Com-
pany Store near you we would like you to write to us.

"THE PROOF OF GOOD SERVICE IS CONSTANT GROWTH"

WRITE TODAY FOR
"THE STORE NEWS"
beautifully illustrated by
photogravure, showing you
how to save large sums on
Dry Goods, Clothing, Fur-
nishings, Shoes and kindred
lines — standard quality
goods! A post-card will
bring it.

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experienced in our lines, to
train for Co-partner Store
Managers, providing for
the continuous growth of
our Company and espe-
cially the expansion planned
for 1927. Write for par-
ticulars.

26-PIECE SET
Original and Genuine
Rogers'
Guaranteed Electro
Table Silverware
6 Forks 6 Tablespoons
6 Knives 1 Sugar Shell
6 Teaspoons 1 Butter Knife
\$5.90
Per Set, In Artistic Box
25c. Extra If
Ordered by Mail

PROMINENT among our Silver
Anniversary offerings is an extra-
ordinary saving in 26-piece sets of
original and genuine Rogers' guaranteed
electro Silverplate Tableware.

One of the largest makers of quality silver-
plate has liberally collaborated with us in pro-
viding this Silverware in a new original "Silver
Anniversary Pattern," as illustrated above. Its
chaste lines and beautiful design will always be
in good taste in every home and for every
occasion. It is made of the highest quality nickel
silver metal with a heavy deposit of pure silver.
Knives have quadruple silverplated handles
with steel blades that will not corrode or stain.
Forks and spoons have reinforced plate where
wear is greatest.

The manufacturer's certificate of guarantee accompanies
every set. The price—\$5.90—is so low as to bring this
Silverware within reach of all for everyday use.

This remarkable Silver Anniversary offering is a high spot in
our long, enviable history of Value Giving. Whether you buy
one of these beautiful sets for yourself or for a gift, it represents
one of the most extraordinary savings ever offered.

It is a Great Memento Silver Offering for a Great Silver
Anniversary.

ers have been buying farm produce
liberally.

Apple Situation Stronger

"The spring apple market shows a
favorable change from the conditions
of late winter. The general farm price
is about 25 per cent higher than in
December. Various leading varieties
in special demand for export, such as
northwestern Winesap, eastern Bald-
win and midwestern Ben Davis are
higher in producing sections and in
some city markets than they were a
year ago, but the country-wide level
of apple prices is lower this season,
partly because of poor condition of
some stock or local over-supply. The
principal varieties of the Cumberland-
Shenandoah region remain a low-
priced feature in eastern markets ow-
ing to distribution of shipments and
the large percentage of fruit affected
by over-ripeness and scald. Present
markets seem to hinge on condition
as much as on supply. Hard, bright
colored apples are selling well for do-
mestic and foreign trade, with best
stock bringing \$3 to \$5 per barrel and
\$2 to \$3 per northwestern box.

"Exports are still moving at about
twice the weekly rate of the spring of
1926 and are likely to continue active
because of the persistent reports of
shortage in the Australian and New
Zealand crop, which usually supplies
much of the British demand at this
season. Foreign markets have taken
50 per cent more apples, and prices
have been holding as well as could
be expected considering the liberal
supply and the less reliable quality
and condition as the season advances.
Much of the fruit is now rather soft
for export, but there is still active
buying of Ben Davis, Baldwin and
Winesap.

"The tone was a little weak in Brit-
ish markets around the first of March,
but many sales of good stock ranged
\$4 to \$6 per barrel and around \$3 per
box. Markets of continental Europe
were in good condition and drawing
rather heavily upon American fruit.

Oranges and Grapefruit

"Supplies of oranges and grapefruit
are expected to be somewhat less than
last season, but still ample for the de-
mand. In fact, shipments have been

running some 15 per cent heavier this
season, and imports from the West
Indies have shown some gain. Esti-
mates of the Florida production were
decreased some after the great storm,
but the falling off is not likely to be
severe compared with last season, and
California bids fair to repeat last sea-
son's large output.

Strawberries Early

"Shipments of Louisiana berries,
which should arrive to the extent of
some 3000 cars in April, are likely to
compete somewhat with other fruit.
The March frost delayed and reduced
production to some extent and may
cut down shipments from other early
states. Prices of first shipments
ranged around 20 cents, pint basis, in
northern markets. Strawberry
acreage of the early and intermediate
states is 20 to 25 per cent heavier this
year, and a larger crop may be ex-
pected from present indications.

"Southern peaches blossomed freely
and the March freeze has not caused
any serious damage. Georgia early
shipments compete a little with the
last of the old apple supply."

MYERS Honor-Bilt SPRAY PUMPS for Trees, Flowers and Gardens

ON fruit and truck farms—on cotton and tobacco plantations—for better shrubbery and gardens—finer trees and flowers—use Myers "Honor-Bilt" Spray Pumps. These quality-built pumps are famous for quick, thorough action and positive results. Portable and easily operated by hand, they make the spraying job a short and simple task. They are unequalled for white-washing and disinfecting walls, cellars, henneries, stables and outbuildings.

Where spraying operations are extensive, Myers Self-Oiling Power Spray Pumps afford maximum spraying efficiency at a minimum of cost.

Honor-Built for Fifty Years

Myers Self-Oiling Power Spray Pumps and complete Power Spray Rigs are built with the same exacting workmanship that has distinguished other Myers products for the last fifty years. An investment in adequate Myers spraying equipment is an insurance for larger crops and bigger profits.

Myers is also world headquarters for Hand and Power Pumps for every purpose, Water Systems, Hay Tools and Door Hangers. See your dealer or write us direct for our latest catalog.

The F. E. Myers & Bro. Co.
150 Orange St. Ashland, Ohio



Take Off Your Hat to the MYERS
PUMPS - WATER SYSTEMS - HAY TOOLS - DOOR HANGERS



Leading Fruit Growers Use the "Acme" Harrow

THEY find that it keeps groves and orchards in perfect condition with least outlay of time and effort. The sharp Coulters cut the weeds and leave a thick, loose mulch of earth. With "Acme" orchard models, you can work close to the trees, even where branches are low.

You will find the "Acme" equally useful in the truck fields. It makes perfect seed beds in less time than any other tool.

Write for booklet, "Bigger Crops from Better Tillage." Ask your dealer about the "Acme".

Nash-Acme Harrow Co.

936 Drexel Bldg. Philadelphia, Pa.



With the Co-Ops.

FARMERS' CO-OPERATIVES are usually designed to sell something that their members produce, or to buy materials that their members need, or both. In New York, however, a very successful co-operative enterprise has been doing business for the past eight years which is unique in the kind of service that it renders. This is the New York Fruit Testing Co-operative Association, Inc., of Geneva, N. Y.

Membership in this association includes professional fruit growers in more than 20 states and in Canada, and the "co-operation" consists in the propagation and distribution by the association of the new fruit varieties created at the New York State Agricultural Experiment Station and the testing of these new varieties by the members under their soil and climatic conditions.

For more than 30 years, the New York Experiment Station has had as one of its chief lines of work the breeding of new varieties of fruit superior to existing sorts. Fruit growers soon heard of these new varieties and clamored for planting stocks. But the station horticulturists could not afford to spare the time to propagate stocks of their new varieties; neither could the station supply the land and labor necessary to grow nursery stock. It was soon apparent, however, that much could be gained by having the new fruits which gave promise at Geneva tried out under a wide range of soil and climatic conditions. Such tests would hasten the acceptance or rejection of the new variety, by fruit growers by many years.

Professional nurserymen, very naturally, were reluctant to propagate and push varieties about which they knew little or nothing and for which there was no general demand. So it was felt that if some intermediate agency could be created which would serve the experiment station by propagating and distributing its new fruits to interested fruit growers in widely separated parts of the country, and which would serve the growers by supplying stocks of the new fruits at a reasonable price, all concerned would be benefited.

Thus, in 1919, the New York Fruit Testing Co-operative Association was incorporated under the laws of New York. Over a thousand fruit growers now hold membership in the association and enjoy the privilege of first refusal on stocks of the new fruits propagated by the association. Surplus stock is then disposed of to interested growers, whether members or not. Membership also implies that the grower who tries out the station seedlings will report occasionally on the behavior of the variety under his conditions.

The fruit testing association propagates only those varieties which the experiment station fruit specialists believe to be so outstanding in their superiority to existing varieties that their acceptance by the industry is almost a certainty, once the variety is sufficiently well known. Incidentally, it is the intention of the association to discontinue the propagation of a variety after it has become established as a commercial sort and when stocks are amply provided by professional nurserymen.

The association provides the land and labor for growing the stocks that it distributes. It also employs a full-time, year-round business manager and conducts all of its transactions much as does any well-organized nursery.

The prices asked for its stocks are just sufficient to cover the costs involved in maintaining the association on this basis.

New varieties of apples, cherries, nectarines, peaches, pears, plums, grapes, raspberries and strawberries are now growing in the association plantings. In addition to the new varieties originated by the Geneva station, other sorts designated as "promising" for New York state and the East, but originating elsewhere, are also propagated to a small extent in order to hasten the establishment of these promising varieties in the East. —J. D. Luckett, New York Agricultural Experiment Station.

THE PLACERVILLE Fruit Growers' Association, located in the foothill region of east central California, has made marked progress in recent years, according to the annual report of Manager R. F. Roddan. In 1926, the association sold 802 cars of tree fruit consisting mainly of Bartlett pears, which brought a total of about \$1,225,000. The association now operates the largest deciduous fruit packing house in California. Last season the pack amounted to 412,150 boxes. Included in this total were 372,331 packages of standard boxes of pears, 234 half boxes of pears, 3813 Los Angelus lugs of pears, 23,555 crates of plums, and 12,217 boxes of peaches. The association also handled 46,340 boxes of various varieties and kinds of fruit packed on ranches. A total of 458,490 packages were handled by the association. All of the pears packed by the association are put out under two labels, the Tahoe and the Placerville Maid.

THE SIXTEENTH annual meeting of the Yakima Fruit Growers' Association was held at Yakima, Wash., on January 25. The association now has 748 shipping members, according to the report of General Manager J. W. Hebert, as compared with 620 last fall and 498 in 1924. The association handled products from 8313 acres in 1926, which represents a gain of 1155 acres over the acreage of 1925 and 2563 acres over that of 1924. The shipments in 1926 were 3297 cars as compared with 2535 in 1925.

The financial plan adopted at the previous annual meeting has been strictly adhered to during the past year. The plan calls for the establishment of three funds which are to be carried separately.

The total bonded indebtedness of the association amounted to \$231,200 on August 3, of which \$143,700 were refunding seven per cent bonds and \$87,500 were underlying bonds. Then the Zillah cold storage plant burned. The amount of insurance recovered was \$173,385.67. With this amount, the refunding bonds were retired with interest and premiums. The outstanding bonds of the association now amount to \$87,500.

Plans for the rebuilding and refinancing of the Zillah plant in accordance with the plan recommended by a committee composed of W. B. Armstrong and P. E. Wise were approved. Refinancing of certain other plants, as well as the making of additions to some, was necessary during the year. The officers of the association believe that the finances, considering the value of the properties on hand, are in considerably better condition than a year ago.

The association treated 660,000

boxes of apples by the Brodrex treatment last fall when it appeared that the fruit would not mature properly. The results proved satisfactory, and the apples are said to have held up better in storage and in transit than apples not so treated. The severe wiping of fruit made necessary because of the arsenic situation, resulted in shrinkage in weight and in increased bruises and punctures, thus adding to the damage from blue mold.

A FINAL report of the Arizona Citrus Growers' Association for 1925-26 shows the pack of that season to be the largest ever turned out by the Salt River Valley. A total of 186,000 boxes of fruit were handled. Of these 14,000 were culls and the balance of 172,000 were all packed boxes. Half of this amount was Marsh Seedless grapefruit, while fancy varieties of oranges constituted one-third of the pack, Navels being by far the most plentiful variety. The balance of the pack was composed of Clayson grapefruit, tangerines and lemons. The total value of the crop was \$610,000.

The prices received for the various varieties of fruit were unusually gratifying, the Navels averaging better than six and one-quarter cents for the fancy and about four and one-half cents for the second grade, while all the grapefruit averaged around three and three-quarter cents a pound net to the grower. Lemons brought excellent prices during the early part of the season, but, as is usual, lagged during the latter part of the year.

The total operating costs of the Arizona Citrus Growers was 65 cents per packed box, the culls being handled for cost. This includes depreciation on building and machinery, and all interest, including the interest on all obligations of the company, among which are the debenture bonds, largely held by the growers themselves. Taxes also were included in this charge of 65 cents, as well as eight cents which was the cost of selling that part of the crop which was marketed locally. The actual cost of packing, exclusive of selling, was 57 1/4 cents, a remarkable showing which compares very favorably with packing expenses anywhere in the country.

The Arizona Citrus Growers assessed 90 cents as a packing charge at the beginning of the last season and, after deducting one per cent of the gross sales, which amounted to \$6100, distributed approximately \$33,000 to the growers on account of packing rebate. Fifteen thousand dollars of this is just on the point of distribution.

There are now 104 growers packing through the association.

The association this year is installing three new stamping machines, which will place the Arizona legend on all varieties and grades of grapefruit, and on oranges as well. During the past season, only the fancy grapefruit has been stamped, but now the oranges also will carry the Arizona label direct to the consumer.

THE SUN-MAID Raisin Growers of California paid to members during 1926 the final settlement on the 1923 crop, progress and final payments on the 1924 crop, and four progress payments on the 1925 crop. In addition, advances were made on the 1926 crop. While the final settlement on the 1925 crop has not been made, the payments to December 1, 1926, on the 1925 crop of Muscats, Thompsons and Sultanas are in excess of the final settlements on the 1923 or 1924 crops. The following table shows the comparisons:

	1923 Crop (Final)	1924 Crop (Final)	1925 Crop (Incomplete)
	In cents per pound		
Muscats			
Ex. Stds...	.02975	.03413	.04
Standards...	.02475	.02913	.035
Thompsons			
Ex. Stds...	.03005	.03390	.035
Standards...	.02505	.02890	.03
Sultanas			
Standards...	.02404	.02252	.025

The 1926 receiving season began on September 1, the earliest date in recent years. Arrangements have been

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made for a credit of \$10,000,000 for use in making advance payments. The receiving stations used for the season were the same as for 1925, with a few changes to bring service within a shorter distance of many vineyards. The date delivery system which was used enabled growers to make deliveries promptly and with less expense than in past years. The mechanical grader which was used in 1925 with success was supplemented the past year with mechanical tests for mold and moisture.

The cost of operating the Sun-Maid Raisin Growers for the year ended August 31, 1926, was but 88 per cent of the cost for the previous year. The major item of expense was interest on money borrowed to make advances. This amounted to 52 1/2 per cent of the total cost.

THE CALIFORNIA Prune and Apricot Growers' Association recently mailed checks aggregating \$232,187.63, representing the final payment to grower members on their 1926 pool of dried apricots.

Except for the final settlements made on the 1919 and on the 1925 crops of apricots, the settlement now completed on the 1926 crop is the earliest in the history of the association. The final on the 1926 pit crop was made in December, 1926, and was the earliest pit final the association has ever made.

Apricots have enjoyed a favorable reception on the world's markets during recent months. With a total green crop some 16,000 tons in excess of the 1925 crop, and with practically all other fruit production, both in California and elsewhere, greatly in excess of the previous year, California apricots have found reasonably strong markets throughout most of the season and at good prices.

The total realized by growers on 1926 crop apricots ranges from slightly over 15 cents on "Standards" to a little over 23 cents on "Extra Fancy Moorparkes." The prices returned to grower members for their 1926 apricots average better, with the sole exception of the 1919 crop which was produced and sold during a period of war activity, than the prices netted on any other crop since the California Prune and Apricot Growers' Association was organized.

Figures are not yet available on the total production of 1926 crop dried apricots, but it is quite probable that it was somewhat under that of 1925 on account of the great increase in the 1926 canned apricot pack. According to the Cannerymen's League of California, the 1925 canned pack was over 2,196,000 cases and the 1926 canned pack was more than 3,390,000 cases of apricots—an increase of over 1,000,000 cases.

THE LOOMIS Fruit Growers' Association, one of the oldest locals of the California Fruit Exchange, enjoyed a very successful season in 1926, according to the *Blue Anchor*. Manager R. L. Tudebury in his annual report stated that 824 cars of fruit were shipped in 1926, of which 525 went to eastern markets and 299 to canneries. The association handled about 55 per cent of the tonnage of its district, and the shipments were the largest in its history. The gross sales to eastern markets alone amounted to over \$700,000. At the annual meeting, members voted to return \$28,000 in refunds and house earnings to grower members.

The association erected its packing house in 1926 at a cost of \$14,000. It handled about 105,000 packages of cherries, peaches, pears, grapes and miscellaneous fruits. The plant is equipped with an automatic pear grader and other modern machinery. Almost half of the fruit shipped to eastern markets the past season was sold in auctions.

FIGURES collected by the United States Department of Agriculture show that over half of the local co-operative associations had member-

ships below 100 in 1925. Reports from 7730 locals of federated groups showed that about 23 per cent had one to 50 members each, that 29 per cent had 51 to 100 members each, and that 30 per cent had from 101 to 200 members each. About 10 per cent had from 201 to 300 members, and less than three per cent had over 500 members. Eighty-two per cent had less than 200 members each.

The percentage of associations having small memberships is largest in the fruit and vegetable industry. Of the 757 fruit and vegetable associations reporting, 64 per cent had below 100 members each and 86 per cent had below 200 members each.

AN UNUSUAL co-operative meeting was held some time ago in the offices of the American Farm Bureau Federation in Chicago. For two days accountants of various co-operative associations held a conference during which they made an intensive study of legal and economic problems pertaining to the business of co-operative associations and methods of making records of various transactions. The meeting proved so satisfactory that it was decided to form a permanent or-

ganization. As a result, the Associated Agricultural Accountants was organized and officers were chosen.

THE OLD Sun-Maid Raisin Growers' Association passed out of existence a short time ago as the result of the securing of a loan of \$5,500,000 from Dillon, Read and Company of New York. Of this money, \$3,400,000 was paid out to San Joaquin Valley growers who accepted notes for deliveries of raisins made to the old association several years ago. According to a recent report, the present association expected to take up the seven per cent preferred stock held by Milo Rowell, trustee for the old association. It was reported that the loan would take the form of a 15-year six per cent first mortgage, which would be a first lien on the buildings, manufacturing equipment and other property of the association.

MORE than 25 per cent of the fruit and vegetable co-operatives listed in 1922 were doing a business of less than \$20,000 a year, according to an investigation conducted by the Bureau of Agricultural Economics. In 1925,

only 20.8 per cent of the associations were included in this group. During the same period, the number of organizations handling business valued at more than \$500,000 a year increased. Only 9.5 per cent of all organizations were in this group in 1922, against 11.7 per cent in 1925.

THE TENTH annual report and financial statement were recently distributed by the California Berry Growers' Association. This co-operative was organized in April, 1917, to assist its members in marketing strawberries and raspberries. Part of the berries are sold locally, and the rest are shipped to eastern markets. About 90 per cent of the strawberries and 55 per cent of the raspberries produced in the territory of the co-operative are handled by the association.

INSPECTION certificates as to quality do not relieve owners of the necessity of complying with state laws covering the labeling of cold storage commodities, according to the Bureau of Agricultural Economics. This ruling has been made because of advertisements which have appeared recently.

Spray Calendars

As published in *American Fruit Grower* for February, 1927, clearly establish the outstanding superiority of Nicotine Sulphate as the accepted nation-wide control for Aphis, Thrip, Leaf Hopper, Psylla, etc. From the Atlantic to the Pacific, these Experiment Station authorities tell growers how and when to use Nicotine Sulphate and Nicotine Dust.

NATION-WIDE APHIS-CONTROL

with

Nicotine Sulphate in "Combination Sprays"

Is Recommended

by Experiment Station Authorities in the Spraying Guides published by the "American Fruit Grower", as follows:

- Spray Schedule for New York.
- Spray Calendar: Shenandoah-Cumberland region (Virginia).
- Spraying and Dusting Schedules for Michigan.
- Spraying Schedule for New England.
- Spray Calendar for the Middle West.
- Spray Table for Northern California.
- Spraying and Dusting Calendar for Florida.
- Orchard Spray Program for the Pacific Northwest.
- General Spray Table for the Southwest.
- Spraying and Dusting Program for Southeast.
- Spraying Calendar for Rocky Mountain Area.
- Spray Calendar for Southern California.

Such is the unanimous endorsement of Nicotine Sulphate throughout the United States. This endorsement is based upon experiments in which "BLACK LEAF 40," the world's leading Nicotine Sulphate and Aphis Specific, was used.

Tobacco By-Products & Chemical Corporation

(Incorporated)

Louisville, Ky.

"Black Leaf 40"

40% Nicotine



KILLS BY CONTACT and FUMES

"Black Leaf 40" kills not only by direct contact (hitting) but in extra measure, by the nicotine fumes. When you mix "Black Leaf 40" with Lime Sulphur, Bordeaux, Calcium Caseinate or with soap alone, you convert the Nicotine Sulphate into volatile nicotine. This "extra" measure of protection you cannot obtain from the non-volatile insecticides.

Dealers Sell "Black Leaf 40" in Several Package Sizes





Lightning Strikes: Lives Saved

"Our home was crowded with a house party. Two college boys consented to sleep in the attic where only a narrow stairway leads.

"During the night lightning struck, setting fire to the stairs.

"Those two helpless boys were our first thought. I quickly seized our **Pyrene** Fire Extinguisher, pumped liquid into the blaze. The fire was instantly out and the two boys were saved."



How can anyone afford to be unprotected against sudden fires? Buy **Pyrene** Fire Extinguisher protection today.



KILLS FIRE—SAVES LIFE
PYRENE MANUFACTURING CO., Newark, N. J.
Write for free booklet "Safeguarding the Farm against Fire"

More Money from the Same Crop!



Without increasing the number of trees or the yield from separate trees, the orchardist can increase the money value of his crop. How? By converting his undergrades (10% to 15% of his crop usually) into Mount Gilead Processed Apple Juice that more than triples the value of undergrade apples.

With this remarkable process each bushel of sound undergrades will produce pure, healthful, sparkling juice that is good the year 'round—that retains all its delicious tang and taste—and that sells at 75c to \$1.00 a gallon.

The Mount Gilead Process relieves the orchardist of worry over low prices and unprofitable fruit. It assures him of a sure market throughout the year and helps him sell his Grade A fruit and the money value of each year's crop is increased 25% to 33%.

Write for booklet giving complete information about the Mount Gilead Process of Refining Apple Juice. Bonus: free orchardists are also offered a free subscription to Mount Gilead Orchard Products News—a marketing publication for orchardists.

The Hydraulic Press Mfg. Co.
80 Lincoln Ave., Mount Gilead, Ohio

Mount Gilead
Process of Refining
Apple Juice



COUPON
The Hydraulic Press Mfg. Co.
80 Lincoln Ave., Mount Gilead, Ohio
Please send me at once free booklet describing the Mount Gilead Process of Refining Apple Juice. Also enter my name for free subscription to the Mount Gilead Orchard Products News.

Signed _____

Handling the Orchard Soil

(Continued from page 5)

through the growing season as high as or somewhat higher than that of the cultivated land. This surprising fact can doubtless be explained on the ground that the cultivated land is producing a much larger tree that is transpiring a very much larger tonnage of water than the trees on the sod land. Hence the data are deceptive. So after all, the appearance and behavior of the trees themselves are reliable criteria of the cultural practices that are being followed.

The following data are taken from a mature Baldwin orchard in New Hampshire and illustrate the point just mentioned, for the yield and growth of plots one and four are inversely proportional to the moisture content. Recent work at the Ohio station confirms the general conclusions of this work:

PERCENTAGE MOISTURE CONTENT OF SURFACE SOIL FOR FOUR YEARS

	Results for Each Year	Four-Year Average
Plot 1, Sod.	16.02 18.87 25.63 20.49	20.25
Plot 4, Tillage	13.69 13.39 19.29 16.45	15.70
Plot 5, Tillage and cover crops	8.93 10.26 13.33 13.24	17.84

Soil Nitrates

The third—and perhaps most important consideration is the effect of the various soil treatments upon the occurrence of the various nitrate salts in the soil. Usually these studies are made from the standpoint of the water soluble nitrates rather than the total nitrogen in the soil, because it is in this form that this essential and usually deficient element is most frequently taken into the plant. A soil that is uniform in nature will show a very different nitrate content if cultivated than if allowed to remain in a tight sod. Part of this difference is due to the grass or ground cover using the nitrates and part to a serious reduction of nitrate formation under certain crops, such as rye, timothy, blue grass and other grasses. Since nitrogen is the most expensive element to buy, and since it is also the limiting factor in growth and fruitfulness of so many orchards, it is of first importance to follow a cultural system that will result in an ample supply of nitrate nitrogen and will not destroy that which is formed.

For our purposes here we may ignore the academic question of what becomes of the supply of nitrates beneath the sod, and certain other theories, for it is sufficient to know that very frequently, sod grown trees suffer seriously from an inadequate supply of this material and some provision must be made for taking care of this deficiency. As will be shown in the next article, this can be done and a satisfactory system worked out without resorting to the plow, if this is desired.

In most soil experiments, it is found that nitrates are lower under either a dust or litter mulch than in tilled land. Our orchard studies tend to bear out this observation, although they are complicated by the fact that the tree roots utilize a large amount of the nitrates, and the residue found in the soil samples cannot be taken as an accurate guide as to the actual amounts that are formed. It is true that the trees frequently do well under the mulch system and show little or no evidence of nitrogen deficiency, but it is better to consider the application of nitrogen fertilizer or manure as a part of the mulch system. When the two are combined, the conditions for growth and fruitfulness are well maintained.

It should also be pointed out that in all of our work we find that the nitrates practically disappear in late summer or autumn, regardless of the rainfall situation at that time of year. This gives reason for the excellent results that are usually obtained by applying readily available nitrogen in early spring for the time when a demand is

made upon this material for early growth and fruit setting.

Effect of Straw Upon the Soil

During recent years considerable publicity has been given to the fact that straw and some other kinds of vegetation exert a deleterious effect upon plant growth when it is plowed into the land or used as a mulch directly over growing plants. The explanation given is that a toxic substance is incorporated into the soil and that the nitrates are utilized by micro-organisms of the soil. We have seen this result in our experiments with straw mulch in the greenhouse, in one plot at Marietta (Ohio) where vegetables were grown and in some cultural experiments with vegetables at Wooster. The generalization has been made that this practice is fundamentally wrong; a far-fetched one it seems to us. The data show clearly



A soil that needs lime

that nitrates are increased by such a procedure after the organic material is decomposed. But in the orchard a permanent mulch would have on the under layers the conditions favorable for the release of this organic nitrogen into the nitrate form, and, in addition, the temporary lack of nitrogen would be offset by the regular practice of applying nitrogen artificially. Hence, we would regard this argument as lacking serious weight when applied to the orchard.

Soil Acidity

Concern is often felt regarding the acid condition of the soil that might develop as a result of annually adding straw, grass, litter or other material to decay beneath the trees. But as a matter of fact in our orchards where a heavy mulch system has been followed continuously for upwards of 30 years, no significant difference in soil acidity was found between the mulched soil and adjacent sod land that had not been mulched. It should be remembered that this material is oxidized on the surface and also that a considerable amount of calcium compounds are added as the litter decays. Even where sawdust was used as a mulch for several years, no injurious results follow in these orchards. In other words, the acid condition of the soil is not the result of the organic matter, but it is derived largely from the mineral acids.

Cover Crops

Finally, let us consider the question of cover crops for the orchard. Is there any evidence that this practice of annually seeding a green crop to be plowed into the land is really beneficial? There are those who question this and argue that they can see no difference where the practice is followed. We would not argue that the results would be as clear cut as those from some other orchard practice; certainly they would vary greatly with the soil, depending upon the starting point. Claims are made for cover crops that would no doubt be

difficult to substantiate in any particular orchard, but we believe it is one of the fundamental principles of permanent agriculture. However, one of the most wholesale illustrations of their value is to be found in the Northwest, where clean tillage was formerly followed and where alfalfa or another legume is now regularly grown. But we have seen just as marked results in the East, although space scarcely permits the citing of data. If this contention be accepted, then when should we build up a soil with this organic matter? Surely there is one clear answer, and that is prior to planting the trees or during the early life of the orchard when the trees do not occupy so much of the land and before extensive shading reduces the amount of crop that can be grown.

Among the benefits of a cover crop that are usually cited are: the maintenance of an increasing ratio of organic matter in the soil; the addition of nitrogen through legumes; the saving of nitrates and other materials that would be lost by leaching; the protection of tree roots; and the checking of growth in autumn. We are not attempting to give directions for their use but simply suggesting the role they play in this general subject. Our next article will deal with the effect of these methods upon the trees, their growth and yield.

Lead Arsenate on Apples Removed by New Solution

AN EFFICIENT and inexpensive method of removing excessive arsenical residues from apples sprayed for the control of the codling moth has been devised by the Colorado Experiment Station. The details of this method, worked out by Dr. William P. Headen, chemist, appear in "Removal of Arsenate of Lead from Sprayed Fruit," recently published as Press Bulletin 63.

According to the bulletin, the new solution is cheap, quick-acting and effective, and causes no bad effects upon the fruit. It is made by taking four pounds each of soda ash and ordinary table salt and dissolving them in 100 pounds of water. This solution can be used in either wooden or iron vessels. It should be heated to 100 degrees Fahrenheit, but should not be raised materially above that temperature.

Enough apples are then added to the solution to cover the surface thickly. The apples should be stirred gently with a mop or some equivalent instrument, care being taken not to bruise them. The stirring should be continued for 10 minutes. On removal from the bath, the apples should be rinsed to remove the wash liquid.

Rust Mites Abundant in Florida

J. R. WATSON, entomologist of the Florida Agricultural Experiment Station, reports a heavy infestation of rust mites in Florida citrus groves this year. Growers are advised to begin control measures, since heavy infestation early in the season is somewhat unusual and indicates probable serious infestation later in the season.

The heavy infestation is likely to cause a large percentage of russeted fruit, as well as other damage. Sulphur in some form is recommended as a control.

GROWERS of citrons in Corsica have organized a co-operative in order that they may control the sale of this fruit, according to the American consul at Marseilles, France. They intend to make the fruit available first to French dealers and importers, since their dealings with Italian importers have been unsatisfactory. Corsica produces one-third of the world's supply of citron.

Rambles of a Horticulturist

(Continued from page 4)

ley, the kind of rootstocks used for trees varies considerably, according to the locality and type of the soil. L. R. Cody, horticultural commissioner of Santa Clara county, told me that most of the prunes are grown on Myrobalan roots. Some peaches are also grown on these roots. In the dry soils of the foothills, almond roots are often used. The Myrobalan roots show considerable variation. Most of the pears are grown on quince (Angiers) roots; however, the trees tend to develop roots of their own above the graft, and after a few years this circumstance tends to overcome the vigorous tendency caused by the quince roots.

The ripening season of fruits varies greatly according to the locality in California. At the time I visited the Santa Clara Valley the pears were just beginning to ripen. In the Sacramento Valley, which I had visited only a couple of days before, the pear season was rapidly drawing to a close. Just west of the valley in San Mateo county, across the Coast Range, the ripening season is about a month earlier.

The Block Orchards

One of the interesting orchards I visited was the 300-acre tract of the A. Block Fruit Company at Santa Clara. The plantings consist mostly of pears and plums. The Blocks have about 20 varieties of pears and think this is not too many. The trees are headed back severely every year, only about six inches of the annual growth of the previous season being retained. This is claimed to increase the size of the fruit, prevent overbearing, decrease wind damage and facilitate cultivation and picking. The orchards are irrigated three times a year at intervals of about a month. The individual tree check system is used, as shown in the accompanying picture. After the ground becomes mellow, it is cultivated with a tractor, disk and spike-tooth cultivator until irrigation is again necessary. The Blocks allow cover crops of weeds and grass to grow during the winter.

Oil Sprays Being Used Successfully

The oil sprays are being used successfully for pears and plums on the Block ranches. I examined trees sprayed with oils, and they seemed to show no damage to fruit or foliage. The oils are not used in the summer on plums which are marketed in the fresh state, since it tends to destroy the bloom. These sprays are said to be controlling red spider, brown apricot scale, aphids, Italian pear scale, mealy bug and codling moth.

The Blocks have two large packing houses of the sawtooth type. No mechanical sizers are used in these, all fruit being wiped and sized by hand. Culls are first thrown out, and the remainder is separated into fruit of three sizes by hand. Women are employed for this work. The handling costs about 12 cents a box. It seemed to me that the Blocks could use mechanical sizers and wipers to advantage, although it must be said that they were putting out a very good grade of fruit.

Celebrated for Sun Drying

The Santa Clara Valley is known for its sun drying. Instead of seeing artificial dryers dotted here and there over the landscape, as in the Pacific Northwest, one sees here great drying yards which are specially reserved for the purpose, with great stacks of crates for holding the fruit. Prunes constitute the largest portion of the dried fruit, although large quantities of apricots are also dried. The prunes are allowed to drop from the trees when ripe. As they are gathered they are first dipped in a hot solution of lye (about one pound of lye to 20 gallons of water) for 10 to 40 seconds, depending on the strength and the temperature, to soften the skins and make them porous for good drying. The prunes are then rinsed with fresh water and are placed on trays and set in the open for 10 days to two weeks,



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depending on the weather conditions. At the end of this time, the crates are stacked and the drying is finished after a few days more.

Due to the uniformly bright weather, a good product is usually obtained, but occasionally fogs and mists damage the product, causing fermentation and discoloring of the prunes. For this reason, artificial drying is gaining in use in the Santa Clara Valley, as well as in other sections of California. About 23 per cent of the prune crop of 1925 was kiln dried. This method is claimed to give a better and a more uniform product and to produce the greatest possible weight of dried product for the weight of fresh product employed. The expense is also lower considering the quality of the product obtained, and the percentage of sugar is higher, when artificial dryers are used.

The Watsonville District

We reached the Watsonville section, which is south or southwest of the Santa Clara Valley, after a 75-mile drive up the Santa Clara Valley and through a rather narrow pass in the coast range. This district directly faces the Pacific Ocean. It is not surprising, therefore, that the weather and cropping conditions are quite different from those found in the shel-

tered valleys. At Watsonville, there is a fog every morning until about 10 o'clock, and sometimes it lasts all day. The rainfall is about 24 inches a year, but the variability is great, the rainfall having varied from seven to 35 inches in different seasons. Normally, irrigation is not practiced except for strawberries, but in recent years of low rainfall, some growers dug wells for irrigating the orchards. The lowest temperature reached in the winter is about 19 degrees Fahrenheit.

The Watsonville section is celebrated for its Yellow Newtown apples. Some Bellflowers are also grown. Red colored varieties apparently are not grown because of the difficulty experienced in obtaining high color. The yields are 250 to 300 boxes an acre, and they are said to be remarkably uniform from year to year. About 3,000,000 boxes are sold each year in the fresh state. In addition, about 4000 tons of dried apples are produced, and about 1,200,000 gallons of cider are manufactured.

Codling Moth Only Recently Serious

Surprising as it may seem, the codling moth was not serious until a few years ago. Now it infests about 70 to 80 per cent of the apples of the district. Spraying will control it, but

many growers have not started to spray as yet. Other enemies are leaf roller, skin worm and mildew. I supposed that apple scab would be quite troublesome in view of the foggy weather, but I was told that it was not a problem.

Many of the apple orchards are planted too close. Some are as close as 20 by 20 feet. A few of the best growers have their trees 30 by 30 feet. Clean cultivation is practiced through the growing season. In the fall and winter, cover crops of grass or vetch are grown. These grow all winter, and thus the maintenance of the nitrogen and organic matter is not a difficult matter in spite of the clean cultivation practiced during the summer.

The Carrol Rodgers Orchards

Mr. Houston and I had a very interesting visit with Carrol Rodgers. Mr. Rodgers is a graduate of the College of Agriculture, University of California, and is one of the influential leaders of the state. He was appointed not long ago by the governor on an important commission. He has about 250 acres of orchard and is regarded as one of the best growers in the district. Although the average yield of apples for the section is 250

(Concluded on page 29)

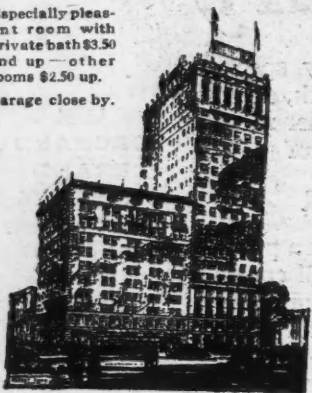
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RATES

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The Pollination Problem in Fruit Growing

(Continued from page 7)

perfect, but under most conditions, at least they yield only shrivelled and aborted pollen grains. This fact was not learned until after this variety had been grown rather extensively for a number of years, with evidently considerable financial loss to the growers because of the reduced yields resulting from conditions that did not supply the necessary cross-pollination.

Several varieties of apples and pears produce pollen of such poor quality that only a very small proportion is viable. This is true also of numerous of the Duke cherries. Among the grapes, several varieties have the imperfect hermaphrodite type of flower with recurring stamens that contain worthless pollen. In the "pistillate" varieties of strawberries, the stamens are in various degrees of abortion and in some cases are merely rudiments.

There are, therefore, various grades and degrees of pollen sterility in individual plants and in entire clonal varieties; and in the extreme conditions, the varieties are completely dependent upon cross-pollination for any setting of fruit.

Pollen sterility is easily determined. The stamens and the pollen may be examined microscopically, and the pollen may be tested for viability by germination tests that are simple and very reliable. The writer has made several thousand such tests of the pollens of grapes, cherries, apples, pears, peaches, currants, gooseberries, strawberries, etc.

In these tests, sugar and agar are dissolved in hot water and then cooled to form a "jell" quite like the "Jell-o" of culinary art. A drop of the agar-sugar-jell is placed on a glass slide and allowed to solidify. When the drop is cool, pollen grains are sown on the surface and the slide is placed in a damp chamber at a temperature of from 65 to 70 degrees Fahrenheit. A few hours later one may examine with a microscope and observe to what extent the pollen grains are viable. By testing with different percentages of sugar, the one most favorable to germination is found. By such tests one can determine whether varieties yield excellent pollen, or pollen with low percentage of viability, or pollen that is worthless. The sugar-agar medium is more reliable and easier to use in these tests than are solutions of sugar in water.

It is to be noted that pollen-sterile varieties may be fully or highly fertile as females and hence are able to yield heavy crops of fruit to proper cross-pollination. There are, however, many plants of a low grade of femaleness. Usually, among fruit crops at least, such individuals are not propagated, or if they are, the variety is soon discarded. Seedlings that do not bear fruit at all are, of course, never propagated as fruit varieties, but such varieties are to be found among the ornamentals.

Self-Incompatibility

When flowers yield excellent pollen and are freely self-pollinating or at least fully close-pollinating (from flower to flower), there may still be an incompatibility which inhibits or prevents self-fertilization. The variety is hence self-fruitless.

This type of sterility is very frequent in all sorts of plants from the grasses to the sunflowers. Among the fruit crops, it is most general among apples, pears, cherries and plums. It is, perhaps, the least understood by the growers, and its effects are least recognized.

It will be apparent to the reader that the two types of sterility—(1) pollen-abortion and (2) self-incompatibility—are very distinct and involve entirely different conditions in plants. They are, however, much confused in horticultural literature probably because in both cases the clonal variety is self-fruitless. The term self-sterile is very generally used for both conditions and for others also, and it merely signifies that a variety is self-

fruitless without indicating the condition responsible for the non-fruiting. The important point of difference in respect to practical fruit growing is that a male-sterile variety is not only unable to self-pollinate, but it is unable to furnish pollen for any cross, while the self-incompatible variety furnishes pollen that will function in certain cross-relations. Interplanting two or more pollen-sterile varieties will benefit none of them. Interplanting two self-incompatible varieties will benefit both, provided there is not also cross-incompatibility and provided their blooming periods coincide.

Classes of Fruits With Respect to Pollination Requirements

The following two groups and four classes can therefore be made for the greater number of the fleshy tree fruits and small fruits. These do not, however, include the conditions responsible for self-fruitlessness of the avocado and the various nut crops, a discussion of which is not attempted here.

A. Self-fruitful.—

1. Fruits requiring no pollination whatever, not even self-pollination, as the Navel orange.

2. Fruits that are fully self-pollinating and self-fertilizing, as the Concord grape.

B. Self-fruitless.—

3. Varieties that are pollen-sterile or strictly pistillate and limited to the degree of this pollen-sterility in ability to furnish pollen for any kind of pollination, as the Brighton grape, the J. H. Hale peach, and the pistillate varieties of strawberry.

4. Varieties that have sufficient viable pollen but are unable to yield fruit as a result of self-pollination because of incompatibility in fertilization, as the Napoleon cherry, the Bartlett pear and the Delicious apple.

Classes one and two may be grown in solid blocks without a reduction in the yield of fruit. Varieties in classes three and four demand cross-pollination and must be properly interplanted or there will be decided reduction in the yield of fruit below that which is possible for the variety.

Much attention is being devoted to studies of self-fruitlessness of such fruits as apples, pears, cherries, plums and grapes. For a number of years reports and discussions of various phases of the pollination problem have been a conspicuous feature of the annual meetings of the American Society for Horticultural Science. At the International Conference on Flower and Fruit Sterility held during the summer of 1926 under the auspices of The Horticultural Society of New York, papers were presented on the sterilities of these fruits from investigators in Japan, Russia, Sweden, Norway, France, England and in various sections of the United States. When these papers are published, it will be of special value to horticulture to have them all summarized together with other evidence previously published in respect to the pollination requirements of the different varieties of fruit.

It is clearly to be understood that the pollination problem is not the only problem encountered in fruit growing. Frequently, other conditions operate to reduce yield even to the point when plants are unfruitful to every kind of pollination. Such conditions are to be seen in the fully self-fruitful plants and even in those that set parthenocarpic fruits; they merely add other classes of unfruitfulness to that which is due to inadequate pollination. The pollination problem still exists to operate when every other condition is fully favorable to heavy yields of fruit.

The fruit grower has always been impressed with the view that "great oaks from little acorns grow." He has rightly felt that much of his thought and labor must be directed to growing trees in the most successful manner. He has been inclined to feel that then the fruit follows merely as an inevitable consequence. But he has

rather recently learned that even when he succeeds in his efforts to grow trees, the crop of fruit does not necessarily follow. When he is compelled to consider from what sources come the fruits, he realizes that though fruits hang from the tree like leaves, they are indeed very different in origin, and that their presence and development may even require the outside influence of cross-pollination.

It will be of great financial value to the interests of fruit growing when the pollination requirements are fully understood for each clonal variety of fruit. Then measures can be taken to more fully provide for the particular needs for pollination and fertilization which each variety may demand.

Thirty or Forty Leaves Required for One Apple

THE LEAF AREA of an apple tree is capable of manufacturing sufficient food material for a given number of apples of good size and quality. On heavily loaded branches and trees there is often less than 20 or 30 leaves per apple, and under these conditions the fruit is small and of poor quality. Although some orchardists have practiced removing a few apples to increase the leaf area per fruit, until recently there were no experimental data available to indicate the exact number of leaves required per apple. Thinning has been more or less of a guessing operation.

M. H. Haller and J. R. Magness, horticulturists of the United States Department of Agriculture, in a series of tests made at the Arlington Farm, near Washington, found that different varieties vary in the relationship between the leaf area and the size and quality of the fruit. For the Grimes and Ben Davis under the conditions of the tests, at least 30 to 40 medium-sized leaves per fruit were necessary to obtain apples of good size and quality, and as many as 50 for the Delicious. When a smaller number of leaves was present, the fruit was not only smaller in size, but was low in dry weight, low in sugar content, and of poor dessert quality. It was found also that apples grown with a large leaf area ripen slightly earlier than the same variety having fewer leaves per fruit.

These determinations were made by ringing or "girdling" the bark of a twig to isolate the fruit and leaves from the rest of the tree. Other investigations had shown that ringing largely prevented the passing of nitrogen and carbohydrates in either direction past the ring, thus making the fruit beyond the ring depend only upon the leaves with which it was isolated. By ringing and thinning the leaves to a definite number at varying distances from the fruit, it was found also that apples can draw food material from adjacent leaves and leaves at a distance of two to four feet with almost equal facility.

Boys Beware

IF YOU fly a kite this summer, do not use fine wire as a kite string unless you are far from electric wires of all kinds. Such strings may fall over a charged wire and seriously injure or kill you.

If your kite becomes fastened among wires, it will be better to leave it there and build a new kite than to take the chance of climbing the pole and trying to disentangle the kite.

It is well to avoid flying kites in the vicinity of electric wires, even though you use ordinary string. Such string, when moist, often is a fairly good conductor of electricity.

"Why did you stop singing in the choir?"

"Because one day I didn't sing and somebody asked if the organ had been fixed."

Hail Insurance on Fruit Crops

(Continued from page 3)

prunes and quinces. Insurance on raspberries, blackberries, cranberries, gooseberries and currants usually is limited to \$250 per acre. The limit on grapes and strawberries usually is \$200.

Uniform rates are offered by all companies in a given district, but the rates may vary greatly between different sections in a state. New York has three divisions in which the rates on apples at present are three per cent, four per cent and six per cent, respectively, reflecting the known frequency of occurrence of hailstorms in those sections. New England has two divisions with rates 25 per cent more than in the other. Still greater variations occur in some states farther west.

Adjustment Methods Being Standardized

The fair and equitable adjustment of claims is still a problem in hail insurance, but it is well on the way to a solution. Formerly it was common for adjustments to be made by company officials or others not familiar with fruits. The result too often was over-payment and an unjustified addition to the loss ratio, or under-payment and a dissatisfied fruit grower. In either case, both the insurance company and the policyholders lost in the long run. An earnest effort is now being made by hail insurance underwriters to enlist the services of experienced fruit men, and there have been few complaints lately from either side.

A large part of the improvement in the adjustment situation has been brought about by the development of systems of checking up on the fruit, which depart as far as possible from the guessing contests formerly indulged in. In one system used quite generally in the eastern states, according to an official of one of the largest companies, the orchard is first examined in a general way to locate the areas of worst and least damage. Then representative trees are selected and agreed upon as furnishing a fair cross-section of the crop. Samples from each of these trees are then taken for careful examination. Hail damage is worst on the windward side of the tree, so the sample usually is taken from the windward and leeward sides, and from points half way around on either side. Damage is worst on the outside of the tree and may be more serious near the top. In taking the sample, a strip is selected extending from the lowest branch to the top of the tree, and every apple is included.

Damaged Fruit is Carefully Graded

These apples are graded by examining each apple without removing it from the tree, or in cases of severe damage, by picking the fruit and grading it on the ground. They are divided into five classes, as follows:

1. **Commercially Sound.**—Apples which are not damaged by hail, or with marks so light that they are negligible. No allowance for loss.
2. **Slight Damage.**—Apples which cannot go into class one, but which are not seriously damaged. Allowance for a loss of 35 per cent.
3. **Severe Damage.**—Apples which have been reduced more or less to culls but still are marketable. Allowance for a loss of 70 per cent.
4. **Total Loss.**—Apples on which apparently there will be no salvage. Allowance for a loss of 100 per cent.
5. **Culls.**—Apples which were reduced to culls by causes other than hail. No allowance for loss.

When the apples have been graded and counted, the average percentage of loss is calculated in the following way:

METHOD OF CALCULATING LOSS				
Class.	Loss Allowance, Per Cent.	Number of Apples.		
1.....	0	21	$0 \times 21 =$	0
2.....	35	63	$35 \times 63 =$	2205
3.....	70	28	$70 \times 28 =$	1960
4.....	100	19	$100 \times 19 =$	1900
5.....	0	5	$0 \times 5 =$	0
		136		\$665

By dividing 665 by 136, the average damage is found to be approximately 44.6 per cent. This calls for the payment of 44.6 per cent of the total amount for which the crop was insured.

This system does not by any means remove from the adjustment of hail insurance the need for great care and well-seasoned judgment. There is no question but that it is more accurate, however, than a blanket estimate of the old type.

Damage Varies with Season and Variety

Hailstorms damage different fruits and different varieties in different degrees. A storm in late July does more damage to early apples than to winter varieties, because the early ripening sorts are softer at that season. Also, there is little salvage in severely damaged early apples because of the crowded condition common on the early market. Damaged Oldenburgs may be unsalable when Baldwins or Winesaps damaged in the same way may be marketable at a fair price.

Fruit growers usually find that hail-marked peaches are more difficult to sell than damaged apples. Unless the hail marks are deep, hail struck quinces are easier to sell than most other damaged fruits. Cherries and peaches usually rot on the trees if struck near the harvesting period, while apples almost never decay. Table grapes lose more in market value than grape juice stock.

Apples which are damaged by hail in early summer often stage a remarkable recovery. It seldom pays to quit when a storm apparently ruins a crop, especially when the damage occurs two months or more before harvest time. Hail damage looks worse than it is because the injured apples are on the outsides of the trees, and the side of the apple exposed to view is the one which bears the scars.

Curiously enough, damaged apples neither rot nor fall off. Unless they are removed by thinning, they are right there at harvest time. When half the apples on a tree are struck by hail, there seems to be nothing left, but if the damaged apples are removed, the large size and uniform high quality of the remaining fruit at harvest time go a long way toward offsetting the apples lost. This experience with hail damaged crops is so common that the value of heavy thinning cannot be too strongly emphasized.

Conclusion

Hail insurance on fruits is still in the developmental stage, but it is on a far better basis than it was a few years ago. It seems to have rendered a worth while service where it has been tried, and if hail insurance can be written by underwriters on a small margin of profit, there is reason to believe that it will expand to meet a real need in equalizing one of the risks in fruit growing. As the business develops, some changes will be brought about. Fruit growers would like to be able to insure a good crop for more than \$300 per acre. They would like to see the rates lowered as the season advances. A difference in rates on early and late apples might be more equitable. Hail insurance does not take into account the extra labor involved in thinning and grading a damaged crop; some time, it must refine its methods to include this loss.

On the other hand, the insurance companies complain that a few fruit growers are unreasonable in making claims—that they insist upon heavy over-adjustments. Over-adjustments are paid for in the end by policyholders through unnecessarily high rates, and this should be clearly understood. Fruit growers are interested in having hail insurance written on the narrowest possible margin. Every claimant must get every cent to which he is entitled, but gross over-payments must be eliminated. Insurance men are giving a great deal of attention to



Get full time service for your money

You'd hardly pay full wages for a part-time hand.

Yet many who use too-light trucks find when they keep a careful check on costs, that they have been doing that very thing.

A very low initial price does not mislead the thinking farmer. The higher cost of repairs, short life and inefficient

service of a cheap, light truck, run the per-mile cost above that of the moderate priced Speed Wagon.

For every job about the farm where a husky hand is needed, Speed Wagons stand ready with the reliability and speed that save many dollars in farm management—and give full time service at a fair wage.

SPEED WAGON CHASSIS PRICES—at Lansing
4-Cylinder \$1090 6-Cylinder \$1240
Heavy Duty \$1985

REO MOTOR CAR COMPANY, Lansing, Michigan

SPEED WAGON

this problem, and over-adjustments certainly are less common than they were a few years ago. Increasing experience and the general tightening up which is now under way should result in better service than has ever before been given in the field of fruit insurance.

A Monument to a Grape

By J. D. Luckett

Agricultural Experiment Station

THE ORIGINAL vine of the Niagara grape is to be marked with a monument or other suitable marker upon which will be inscribed a brief statement of the history of the vine and of the originator of the variety. Provision for the monument was made at the meeting of the New York State Horticultural Society in Rochester last January.

Credit for the origination of the Niagara grape apparently belongs to two men. The variety was originated by Claudius Lamb Hoag of Lockport, N. Y., while he was associated with

B. W. Clark, also of Lockport. Under the circumstances both men apparently deserve credit for this variety.

First propagated in 1868, the Niagara was one of several hybrids derived from numerous crosses between Concord, Cassady and Martha. The exact parentage of the variety is unknown, save that Concord was one of the parents. Cassady is supposed to be the other parent, but this point cannot now be definitely established.

The original vine of Niagara is still growing on what are now the grounds of the State Home of the Odd Fellows at Lockport, and efforts are being made to "rejuvenate" this veteran. The action of the state horticultural society insures that the early history of the grape that has made the fortunes of many of the society's members will be preserved for coming generations of fruit growers.

He—I talked with a very interesting man today. He was a Buddhist. She—Oh, I'd love to meet him—all my geraniums are wilting.—Pearson's.

The Orchard Home Department

Sunshine for Babies

MORE and more the health authorities are insisting upon the value of direct sunshine in health building. This being the case, it comes in quite handy that the sunshine for 1927 is scheduled to have a peculiarly tonic quality, this being due to an increased amount of the specially desirable ray.

Sunshine appears to be even more necessary to the well-being of babies than to adults. It plays a large part in bone building. "If a baby is constantly deprived of direct sunlight, his bones will not develop normally, his muscles will be flabby and his skin will be pale. He will probably have rickets."

Mothers are warned to be on the alert for symptoms of rickets in infants. Sun baths and so-called "bottled sunshine" (which is an alluring manner of speaking of cod liver oil) are the best preventives. It should be easy for orchard mothers to provide so much of the first that they need not have recourse to the second remedy.

Since summer suns are sometimes absolutely scorching, a degree of caution should be exercised if the infant's bare skin is to be exposed. The head also may need protection. It might be safest to talk it over with your doctor or to write to the Children's Bureau of the Department of Labor, Washington, D. C., for detailed information on the correct method of giving sun baths to babies.

It would be well for everyone to take advantage of the coming months of glorious sunshine and spend as much time as possible in the open air. Many domestic tasks can be performed on porches, and children should be encouraged to play out of doors all the long hours of the summer days.

Much strengthening contact with summer sun and air will render the body more resistant to annoying and dangerous winter colds and ailments.

Do Not Fear Pure Water

WARM WEATHER will soon bring thirty days, and drinking pure water will bring relief not only from thirst but from heat.

Abundant water taken into the system promotes perspiration, and it has been computed that 1036 thermal units of heat are absorbed by every pound of perspiration evaporated from the skin. Moreover, cold water taken into the body must go through the process of having its temperature raised to blood heat, thus cooling one effectually.

Those who have been led to believe that it is dangerous to drink much water in hot weather will be glad to learn that it is merely advisable not to drink too much at one time. The perspiration induced by a plentiful supply of water is really healthful, and by means of it much waste and deleterious matter is carried off through the pores of the skin.

An Aztec Father to His Son

NOTHING FINER exists in the way of a father's advice to a son, than the ideals embodied in the words which the Aztecs of old Mexico were wont to impress by oft repetition upon the youth of their time.

It is amazing to find standards of such loftiness, and even delicacy, among the idolatrous Indians whom the Spanish general Cortez found early in 1500 A. D., living. It is true, in a magnificent city, yet so barbarous that they sacrificed hordes of human victims to placate their gods. Most horrible of all, the lives of tens of thousands of innocent babes were offered up by them in the name of religion.

You will be interested to read some of these admonitions which every Christian of today might profit by.

Nothing can better show the inexplicable contradictions which exist in human nature.

"Happen what may, endeavor to live an upright life, ceaselessly praying to God to help thee. He created thee and to Him thou belongest. He is thy Father. He loves thee even more than I love thee. Let thy thoughts be of Him."

"Be not silent to the poor and unfortunate, but make haste to console them with kind words. Honor everyone, but especially thy father and mother."

"Never mock at old men, my son, nor at deformed people. Do not mock him whom thou seest commit a fault, and do not throw it in his face. Enter into thyself and fear lest that which offends thee in others, may happen to thyself."

"When thou art at table, eat not too fast and show no dislike if a dish displeases thee." Such scrupulous consideration is somewhat grimly humorous coming as it does from one who cheerfully ate the heart of a human victim. "If a person arrives at thy meal time, divide thy meal with him, and do not watch him as he eats."

"Never pass before thy elders unless forced by necessity or unless they order thee to do so."

"Never lie, for it is a great sin. Tell the simple truth and add nothing thereto. Slander no one and be silent in regard to the faults thou seest in others."

"Lead a moral life. Wait until the young girl whom the gods have destined for thy wife reaches the right age to marry thee."

"Take from no one what is his, thou wouldst be the shame of thy people when thou shouldst be their honor."

The young lad is exhorted to earn his own living honestly and to love his work.

"By these counsels I wish to fortify thy heart. Neither despise them nor neglect them; thy life and happiness depend on them."

An Aztec Mother to Her Daughter

THE AZTEC mother's advice to her daughter may be read in comparison with the father's advice to his son. It shows very plainly the relative status in which men and women were held. Indeed, most of it would be entirely appropriate in a set of rules for domestic servants.

It first exhorts the girl to be good, since otherwise she will not get a husband. She is told to rise early, work continually, and to be a clean, good housekeeper.

She is charged to "Come quickly when called," to be polite, to "look not to right or left," and to be most discreet for fear of scandal. We pity the little maiden who may permit herself to "rest in the shade" but not to "take the air."

Rather more to our liking is the advice: "Deceive no one. Live in peace with everyone. Love everyone that everyone may love thee."

After the girl has been impressed with the fact that she belongs to her husband and that all her obedience and service is due to him, it comes with almost startling modernity to read: "If he takes bad care of thy affairs, advise him well. But if he cannot take care of them, take care of them thyself and pay thy workmen promptly. Lose nothing for want of care."

If frequency of use counts for anything, the little word "the" is the most important in our language. Dr. Dewey of Harvard has estimated that in every hundred words on the printed page, this one occurs seven times. No other word in our language is used so frequently.

By Mary Lee Adams

Town and Country Gardens

IN ORCHARD HOMES, especially in springtime, it is easy to believe that man was created in a garden. Our roots go deep down into the soil. To some of us it still seems a thousand pities that these roots should ever be transplanted to cities.

Yet even enthusiastic lovers of the beauty and freedom of country life must admit certain superiorities in the city. The country has overcome some of these. It has banished loneliness with telephones and radio. It has minimized distance with good roads and motor cars and, by means of consolidated rural schools, has solved the old dilemma as to whether the children should be sent to the city for instruction or kept inadequately educated at home.

Each Strives to Keep Ahead

While all this is much to the credit of the country, we must not forget that even while we are catching up with our former handicaps, the city disconcertingly overtakes us where we thought ourselves pre-eminent.

You remember the discomforted surprise when, a decade ago, city boys surpassed country boys in the wartime physical tests. In spite of the natural healthfulness of country life, better medical attention in the cities, and better enforcement of proper sanitation and hygiene won out over our boasted fresh air and sunshine, fresh vegetables, fresh dairy produce, etc. Indeed the cities were often getting cleaner milk than the country.

The jolt we got then did us good. It called attention to neglect along certain lines. It aroused rural communities to the high importance of sanitation, hygiene and school clinics. The constant interchange and half unconscious rivalry that goes on between city and country is interesting and wholesome. Neither likes to have its superiorities taken from it. But they must be honestly earned if they are to be maintained.

Co-operate with Nature

The rural home possesses so many natural advantages that the need for man-made beauty is too often overlooked. A fine view cannot altogether make up for a scrubby lawn and neglected premises. Cities are more alert to this. If we would prevent usurpation of our superiority in natural surroundings, the lines of defense must be laid in this springtime season.

City lovers of flowers will usually pine for a country home where ample space for a delightful garden may be found. Meantime, they make the most of their opportunities. There are fewer neglected premises in the residential districts of modern towns than among the same class of residents in the country.

Towns are wide awake to the actual cash value that well kept grounds add to property. There, too, people live nearer together and the charming garden of one puts to blush the adjoining neglected plot. As soon as half the people on the block have brought their grounds up to a high degree of ornamental cultivation, those who fail to follow suit become absolutely unpopular. They are not considered a credit to "our street." Sensing this critical attitude, they either improve or move.

Little City Gardens

It is a delight to the eye to wander through the residence districts of many of our towns and smaller cities. The gardens of the very wealthy are often quite dazzling, but since the appeal of flowers is as much spiritual as aesthetic, more complete satisfaction may be taken among those streets where people of moderate means are putting heart and soul and good honest toil into their gardens.

When the spring sunshine lies level

at sunset upon the little gardens that line the street, young couples may be seen working ardently together. The men, unwearied by outdoor toil, find relief from the inactivity of office work in the exercise of digging or the fun of playing the hose.

Laughing children tumble about and bird songs are heard just as in our own homes, for when they are not molested, birds are as fond of green suburbs as they are of the country. The dear little homey gardens, cultivated by the owners themselves, go far to redeem the prevailing sordidness of the city.

Ours Can Be Made Lovelier

Our opportunity for creating beauty around our homes is greater. City gardens are surrounded by walls of wood and brick and mortar, far from an ideal setting for flowers. While we, if we have wisely preserved our trees, already have the best of backgrounds.

A leafy screen blends more suitably with blossoms than the encroaching walls of many houses. A city home must be forgiven for standing cheek by cheek to its neighbor, or with no greater distance between than the one way drive to the garage. But that's not the country way.

We have space that cries for grass and flowers. And though flowers are the crowning glory of the home grounds, it is best, where nothing has yet been accomplished, to devote the first energies to shrubs and lawn.

Think a Plan Out Beforehand

No matter how simple or small your garden must be, have a definite plan before you begin. Otherwise, haphazard planting may result in confusion, and all the sweet orderliness and decorative quality of your garden will be lost.

The services of a professional landscape gardener are generally too costly. You must try to visualize the future garden—to see with the mind's eye that which does not yet exist.

Try to understand why the effect of one garden is so much more beautiful than that of another which has equally fine flowers. You'll find it's generally due to a better setting. Every successful garden has some hint to offer you, some suggestion you can make use of to secure satisfaction in your own plans.

Gardens Need Greenery

Trees and shrubs play an immensely important part. You won't often find a thoroughly pleasant garden without green grass. The miracle has occasionally been worked. In some places the sandy soil stubbornly refuses to support anything like a lawn. But it is possible to overcome this lack only by producing myriads of blooms, great clouds of color that hold the eye enchanted. And all the riot of brilliant hues must be supplemented by the verdure of trees and shrubs.

Nearly everywhere, grass will grow if given enough encouragement. It will grow right up to the roots of trees if the right kind of seed is used. With a few trees well placed, with enough shrubs to hide unsightly foundations and to "tie the house to the ground," and with a well kept lawn to refresh the eye, much charm has already been created even without flowers.

Too Sweet to Resist

Better a lawn without flowers than flowers without a lawn, say some, and from a purely decorative point of view this may be true. But there's a deliciousness about blossoms that nothing can rival.

It's all very well to dwell on the undoubted wisdom of first securing a good lawn, but if the place be new and no lawn is yet established, I, personally, would dig a little plot close at hand and (wise or unwise) sow petunias, and pansies, and nasturtiums, and phlox, and verbenas, and asters, and oh! ever so many more if I wanted them.

Rambles of a Horticulturist

(Continued from page 25)

to 300 boxes per acre, Mr. Rodgers obtains an average of 500 boxes. His trees are set 30 by 30 feet and have plenty of room. They are quite open, having been pruned rather heavily. The main leaders are taken out early in the life of the trees, and the trees are trained to the vase system. No heading back is practiced, but considerable cutting to laterals is done. There were quite a few suckers on the trees. The trunks had been cleanly scraped of all loose bark.

Mr. Rodgers installed wells for irrigation a few years ago during a period of low rainfall. He irrigates occasionally now as needed. In 1925, he irrigated in November and December for the good of the trees. He has been spraying systematically. Until recently he has been using oil in the winter and arsenate of lead and wettable sulphur as a calyx spray and again two weeks later. Last year he used Volck for the calyx spray and again two weeks later. Good control was secured, and there was no injury of importance. He thins his Newtowns and spaces them carefully. The Bellflower thins itself pretty well and little thinning of this variety is necessary. He has his own brand and markets his own fruit. He ships considerable quantities of Newtowns to Great Britain. There are no co-operatives handling apples in the Watsonville section.

The Strawberry Industry

While the apple is the principal fruit grown at Watsonville, I was very much interested in the strawberry industry. The outstanding feature of this industry is the length of the bearing season. It is the normal thing for the plants to bear continuously for eight to 10 months. J. E. Reuter, a grower living at Mayfield, has produced berries commercially from a patch continuously for 14 months. What is more, the berries are not everbearing sorts. The principal ones grown are the Necoma, New Oregon, Malinda and Banner. These are single crop varieties in other sections. No doubt, the uniformly cool weather, the rich soil and the use of irrigation bring about conditions which account for these unusual results.

The berries are grown mostly on comparatively level land in order that water may be readily applied. The plants are for the most part grown in Oregon under the direction of the local co-operative. They are set by most growers 15 inches apart in double rows 26 inches apart. The double rows are set on a flat-topped ridge

about four inches high. A space of 24 inches is left between each pair of double rows. The water is allowed to run down the furrows, and thus the plants are sub-irrigated. Some growers space the runner plants very systematically but others appear to allow a considerable quantity of them to take root. Complete fertilizers, fish meal and sheep manure are used at intervals after the plants are set.

The red spider is quite serious on strawberries in the district and is one of the hazards of the business. Summer oil sprays applied two or three times are said to be controlling this pest very satisfactorily. About 1000 acres were sprayed with oil last summer. Thrips are also causing some damage.

Practically the entire crop of berries of the district is handled by the Central California Berry Growers' Association, whose headquarters are in San Francisco. This organization handles 90 per cent of the berries of northern California and in addition to strawberries, it also handles Loganberries and blackberries. It has both Japs and whites on the board, the whites predominating. The berries are mixed with an equal volume of sugar and are then packed in glass containers and placed in storage and shipped to eastern markets. Part of the crop is sold locally in the fresh state.

Watsonville was formerly the greatest berry producing center of the world. However, when the California alien land law was passed, it became impossible to rent land to Japs and the industry decreased in size. Labor can now be obtained only on a day basis. Some Japs who owned land before the law was passed still retain possession of it, and others born in the United States are now buying land. This and other things are tending to gradually increase the berry plantings. There are about 2000 acres of strawberries in central California at present.

WHEN conscience pricks us for extravagance and we almost make up our minds to use less gas next month, it's soothing to reflect that, according to financial authorities, we're really promoting the general welfare by dashing about. These experts assure us that the prosperity of our country today is basically due to our free spending. It seems that the more gas we use, the faster the wheel of fortune whirls. Keep motor cars and wealth circulating. The quicker the "turn over" the bigger the business returns.

Fertilizing Apples in the Northwest

(Continued from page 8)

been materially affected by fertilizer applications.

4. The application of fertilizer did not to any extent stimulate increased twig growth.

The results which have been obtained in these investigations indicate

In the meantime, I am confident that the use of cover crops is largely responsible for our high acre yields, and they should be more generally used in our program of soil improvement. Orchards in cover crops, where plenty of water is available, are quite

FERTILIZER EXPERIMENT IN BAILLIE ORCHARD, COEUR D'ALENE, IDAHO. VARIETY—JONATHAN.

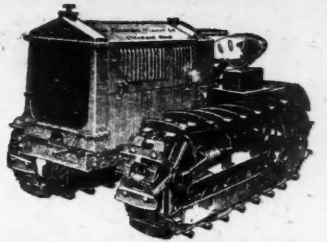
Fertilizer used.	Pounds per tree.	Average yield per tree in pounds.					
		1922.	1923.	1924.	1925.	1926.	Average.
Nitrate of soda.....	3	340	149	284	Freeze	250	255.6
Nitrate of soda.....	5	248	216	235	Freeze	235	233.0
Nitrate of soda.....	8	224	211	231	Freeze	252	229.5
Check.....	0	229	153	216	Freeze	183	190.2
Nitrate of soda.....	5	202	245	205	Freeze	237	222.2
Acid phosphate.....	8						
Nitrate of soda.....	5	152	191	191	Freeze	155	174.7
Potash.....	2						
Acid phosphate.....	8	184	170	206	Freeze	185	186.2
Nitrate of soda.....	5						
Acid phosphate.....	8	156	134	198	Freeze	95	145.7
Potash.....	2						
Sulphate of ammonia.....	5	218	178	200	Freeze	145	185.2
Sulphate of ammonia.....	8	182	212	178	Freeze	127	174.7
Sulphate of ammonia.....	8	209	250	202	Freeze	200	215.2
Check.....	0	176	185	225	Freeze	...	195.4
Sulphur.....	4	230	182	223	Freeze	150	196.2
Clark's special.....	10	221	224	168	Freeze	170	195.7
Manure.....	400	211	191	173	Freeze	210	196.2

that more experimental data are needed before definite recommendations can be made concerning the use of commercial fertilizers in many of our western orchards.

vigorous and are producing fairly good crops. A good cover crop will furnish permanent shade and will add nitrogen and organic matter to the soil.

Cletrac

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POWERFUL, compact, low hung—Cletrac is the finest tractor ever built for orchard work. With a Cletrac it is easy to work up close to the trees without disturbing the fruit—to get under the low branches—to turn 'round in close quarters. Especially on hillside work—up, down or across—Cletrac is unbeatable.

"My Cletrac '20-K' is taking care of hills I never dreamed could be cultivated with a tractor," says J. A. Richardson of the Lakeview Ranch, San Fernando, Cal. In California alone there are more than 6,000 Cletracs in use.

You will find Cletrac a remarkable tractor for your work. Its convenient "One-Shot" lubrication—its perfect traction in any footing, delivery of full power on the turns, light tread, absolute stability—all of these features make it more useful and more profitable for you.

Find out about Cletrac and the better and more profitable service it will render you. Three sizes—to fit all requirements. Write today for literature.

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Only
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Such a Tribute
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Hood River

APPLE GROWERS' ASSOCIATION
Hood River, Oregon

Grasselli Chemical Co.
St. Paul, Minn.

Question: We too pleasure in acknowledging the fact that we have used Grasselli's Arsenate of Lead continuously for more than fifteen years.

Answer: The continuous use is evidence itself that results have been satisfactory.

In supplying our members with their lead requirements our first consideration is quality and the next is dependability of supply and service. We are more than satisfied with the uniform high quality of Grasselli Arsenate of Lead and take this opportunity of thanking you for your unexcelled service in keeping us supplied at all times, even under most trying circumstances.

Trusting that these satisfactory relations may continue for many years to come, we remain
Very truly,
APPLE GROWERS' ASSOCIATION
Publishing Agent

THE Apple Growers Association of Hood River, Oregon, has a national reputation. The thoroughness of their protective measures and the resulting quality of their fruit is known far and wide.

We cannot but feel distinct pride, therefore, in a letter they wrote us recently—reproduced above.

Please note that third paragraph particularly:—

"In supplying our members with their lead requirements our first consideration is quality and the next is dependability of supply and service. We are more than satisfied with the uniform high quality of Grasselli Arsenate of Lead and take this opportunity of thanking you for your unexcelled service in keeping us supplied at all times, even under most trying circumstances."

You will get that same high quality and that same dependable service when you order **GRASELLI GRADE**—

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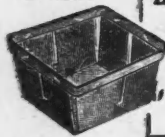
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WHEN you spray fruit trees, you breathe chemicals that can easily injure your nose, throat and lungs. Why run this risk, when Dr. Willson's Dust and Spray Mask offers you protection? Comfortable. Allows free breathing. Protects you from dust as well as sprays. Wear it for threshing, treating seed, in the care of poultry. Ask to see one at your nearest hardware, drug or general store. Priced at \$2.25. If your dealer can't supply you, write to WILLSON GOGGLES, Inc., Reading, Pa., U. S. A.

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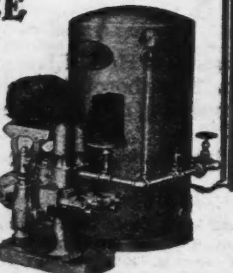
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CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL



Rejuvenating the Old House

LAST MONTH we talked about the rejuvenation of the living room, especially stressing general principles of house decoration which must be considered if good results are to be achieved. This month we shall discuss as many other rooms as space will permit. We will begin with the dining room.

Much the same means may be used to freshen up the dining room as were used in making over the living room, so the reader will doubtless want to refer back to the article appearing in the "Chats" department in the March issue of the AMERICAN FRUIT GROWER MAGAZINE. Information given last month will not be repeated here.

Treat Dining Room in Same Manner as Living Room

Often the woodwork, walls and windows in the dining room are treated in exactly the same manner as in the living room. This is invariably true in houses which have the living room and dining room opening into each other through a large archway or by double doors. Then, when more living room space is needed and the two rooms are used together as one, they will really give the effect of one large room, since the drapes, wallpaper or calcimine and woodwork will be the same. The floors would be finished in the same way as in the living room in any case. Rugs should not be identical in pattern in the two rooms but should harmonize in the general color scheme.

Woodwork and floors should be treated in the same way throughout the house, with the possible exception of the kitchen, bathroom and breakfast nook, if a feeling of unity or "belonging together" is to be obtained. The rooms in any one house should have some characteristics in common so that they will seem to be related one to the other. Ivory is perhaps the most satisfactory color for the woodwork, while a tan or light brown paint or clear waterproof varnish gives the best finish for floors. The kitchen, bathroom and breakfast nook may well have an inlaid linoleum floor covering.

The furniture in the dining room will depend on the type and size of the room, the general style of furnishings in the house, and the means of the family. Old, badly marred tables and chairs may be refinished with delightful results by removing the old varnish with sandpaper, and painting with two or more coats of blue, green, orange, gray or ivory enamel, with a touch of gay color for trim. Choose colors which will harmonize perfectly with colors in the rug and drapes. Do not over-decorate old furniture, however, or the general effect will not be as good as with a simpler decoration.

Gateleg Tables Popular

If the homemaker wishes to replace the old table and chair set, she can do so inexpensively by purchasing a plain unfinished gateleg table and from four to six Windsor or ladderback chairs, then finishing with flat white paint and two coats of enamel, in one of the colors suggested above, with just a touch of orange, blue or red for trim. If the drapes and rug are quite plain, the chair backs and table may be made more festive in appearance by applying suitable flower or fruit designs. These designs may be applied by stencil, painting, or by the use of small transfer decorations. The latter can be purchased complete, ready to be moistened and stuck on the desired place; after a time the

paper is removed, leaving the painted design in place, just as you pictured it in your mind.

A tea wagon will be found of incalculable value as a labor saver in serving and removing dishes. An unfinished tea cart of good lines may be purchased and finished the same as the dining set. Or, if the table and chairs are finished in some quiet color, as gray blue, gray or green, the tea cart might be finished all in the bright color used for the trim on the dining set. If the room itself is inclined to be cheerless and dark, use bright color generously, but if it is light and sunshiny, less bright color will give the best effect.

Corner Cupboards Popular

If the dining room contains no built-in features, you will want to provide china cupboards and some sort of buffet or serving table. These may be purchased unfinished and finished in ivory to match the woodwork, or in color to match the dining set proper. If done in color, you will have to beware of overdoing the color idea. If the room is small, space for the china, silver and table linen may be best provided by built-in corner cupboards. Such corner cupboards, with small-paned glass doors above and drawers below, will give ample storage space and at the same time add much to the general effect of the room. Interesting and unusual china and glassware may be displayed in the upper part of the cupboards. One or two such cupboards should take care of the needs of the ordinary family.

The desirable accessories for the dining room would include candlesticks or candelabra and candles, an interesting fruit or flower bowl, and a crash scarf or runner for the dining table, a mirror hung from picture mould by cords above the serving table or buffet (unless the buffet is built in with mirror above), a scarf or runner and one or two pieces of pottery for buffet or serving table, flat cushions for chair seats made of same material as drapes (consider this possibility in selecting material for drapes), parchment or silk shades for lights or lamps, and one or two good pictures harmonizing in color and subject to the room furnishings. Soft-colored fruit and flower plaques may be very beautiful if fashioned in good taste, and they are most popular just now for dining rooms. Ferns, rubber plants and flowering potted plants are also delightful additions to the dining room furnishings. A tea set or chocolate set may occasionally be displayed on the tea wagon with excellent effect.

Furnishing the Hall

We will now consider the entrance hall. This room requires very little furnishing, but such pieces as are used should be appropriate. Ye Editor hopes you are one of those fortunate persons whose stairway leads gracefully to the upper story from the hall. Her dream house has an open stairway done in ivory, except for a mahogany bannister rail and mahogany or cherry wood steps, with a landing below a window where the stair turns, and a spinning wheel on this landing where the light streams in through the window. Isn't that a dream worth dreaming?

Two straight chairs, with a small semi-circular wall table between, one picture, mirror or piece of tapestry or batik, and one small rug will furnish even a spacious hall nicely. A smaller hall may require but one chair and a table, together with suitable

picture and rug. A true entrance hall is more or less formal and dignified and is used only in a large dignified house. Therefore, the furnishings are arranged in dignified manner in a prim row along the wall, or the stairway, as the case may be. The walls, woodwork and floors will, of course, be finished in the same manner as in the living room and dining room.

Kitchen to Be Cheerful

The kitchen and bathroom are usually similar in finish. They are primarily utilitarian, but they may, at the same time, be most cheerful and inviting. If Milady has a secret, yet guilty, feeling that she "just dreads" to go into her kitchen to prepare a meal or wash dishes, she may just as well get over the guilty feeling and the dread, because the trouble is not with the housekeeper but with her workshop—her kitchen. If she can change it to a light, airy, convenient place, her hours spent in the kitchen will become a pleasure.

Woodwork in the kitchen and bath may be finished in ivory or a very light gray. If in ivory, then the walls and ceiling may be calcimine a nice bright sunshine yellow, or a pale lettuce green, with exceptionally good effect. If the woodwork is in light gray, then the walls may be a pale pinkish mauve, orange, lettuce green or gray. If the kitchen is dark, then ivory woodwork with orange, yellow, or pale green walls would be the best combination. Yellow is a cheerful color, which is, at the same time, light in hue. The bathroom may be gay in orange, yellow or green to match the kitchen, or it may be in quieter grays and creams to match the woodwork. The newer houses all have them gay, but many of the older generation of housekeepers would be horrified at the mere suggestion of a bright colored bathroom. We must confess to liking them gay.

Inlaid linoleum in quiet pattern and in colors harmonizing with the chosen color scheme is the only practical yet attractive floor covering for the kitchen and bathroom. Beware of buying too "dizzy" a pattern, but also beware of the too dull pattern. Inlaid linoleum may seem expensive at first thought, but in reality it is economical—it will wear for 20 years if laid on a smooth floor and given reasonable care, it can be quickly and easily scrubbed clean, it dries quickly, and if waxed immediately after scrubbing will stay clean for a long period.

Conveniences Needed

If the kitchen is to be really rejuvenated, it should have some modern conveniences added. Dad or the boys should be prevailed upon to exercise their carpentering ability, or better still, if the men on the place are inexperienced, a good carpenter should be procured for a few days. Have a broom cupboard and folding ironing board built in the wall, have the hot water tank enclosed, with the enclosure going clear to the ceiling (upper space serves for storage in this way). Have a wide hood placed over the kitchen stove, with a small outlet into the chimney for ventilation. This hood will draw out all fumes and gases from the kitchen, keeping the room cooler and airier. Have plenty of windows, with at least one of them facing to the east or south if possible.

The cupboard and sink arrangement in the kitchen is most important. Most of the modern houses have one wall space, preferably opposite the stove, taken up by the sink, with drainboards and cupboards at each side and one or more windows above it. This is the ideal arrangement. Any carpenter can build such a set of cupboards, and the men folks can install the sink. Be sure the sink is exactly the right height for you. A refrigerator should be procured and space provided for it, if the household is really to know the pleasures of summer comfort.

Window treatment is important in the kitchen, due to the need for conservation of light. White or yellow dotted ruffled marmalade tie-back curtains are most effective and practical for this purpose. The tie-backs

the entrance hall and dignified large dignified he furnishings in manner in all, or the stair-be. The walls, will, of course, in manner as in ing room.

Cheerful

bathroom are ish. They are ut they may, at st cheerful and s a secret, yet "Just dreads" n to prepare a he may just as ty feeling and trouble is not but with her t. If she can iry, convenient in the kitchen

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and valance may be of gingham in the chosen colors, or they may be of cotton crepe with rows of rickrack in gay colors for trim. Another pretty effect can be secured at small expense by making valances and tie-backs of "decorative" oilcloth (it is soft and comes in delightful colors), using rows of rickrack in contrasting colors for trim. If the windows are high and narrow, the valance may be deeper. If they are low and wide, the valance should be quite shallow.

Need Comfy Chair

There are a number of other means of adding "homey" touches to the kitchen. If space permits, the housekeeper should have a low rocking chair beside a table in some light corner, where she will have a nook in which to rest and read occasionally. The door between the kitchen and dining room should swing either way. A touch of color may be added to an otherwise plain door, by placing a piece of wallpaper or cretonne showing a gay bird or basket of flowers under the little glass hand plate on the door. Every kitchen should contain a high stool, or combination stool and stepladder. The top of this may be painted orange, yellow or green to match the walls. A small work table on good casters that will roll easily is a great convenience in cooking and in serving. This table should be finished in such a way as to hold hot dishes without marring the table. One of the very newest "tricks" for the kitchen is to paint and calcimine

the insides of the cupboards a bright color to match or harmonize with the walls and curtains. Thus you give yourself a little "surprise" every time you look in the cupboards.

The bathroom may have the same curtains as the kitchen, or its window treatment may be different, just as you desire. Orange or yellow with green or blue are all effective in combination and appropriate for this room. The bathroom fixtures should be a shiny white. The woodwork is best when light gray, since the fixtures are white. A good mirror with medicine cabinet back of it is absolutely essential. A desirable feature would be a built-in dressing table with mirror above, two small drawers in the middle section and cupboards for towels, etc., at either side.

Breakfast Nook Useful

Few old houses contain a breakfast nook, but if such a room can be arranged for, the housekeeper will be saved many steps each day. A corner of the kitchen, even partly partitioned off, will serve the purpose. The breakfast nook should be gay with color. The walls may be papered in bright large-figured paper, and the windows may be hung with tie-back curtains with gay valances, or if the paper is more or less quiet, the curtains may be of striped or gorgeously figured cretonne or bright colored cotton crepe. Chair or seat cushions should be provided of the same material as that used for the curtains or valances.

Next month we will discuss bedrooms, attics, basements and porches.

Recipes for Pineapple Desserts

PINEAPPLE is a luxury that comes within the means of any of us. Nothing else can give quite the same sweet-tart flavor that pineapple gives to desserts, salads, punches, fruit cups, meats and meat sauces. Purchase a half-dozen cans each of grated and sliced pineapple and keep them on hand for emergency salads and tasty desserts. The recipes given this month are for pineapple desserts.

Pineapple Cream Pie

Heat $\frac{1}{4}$ c. milk. Mix $\frac{1}{2}$ c. sugar, $\frac{1}{4}$ t. salt and 2 T. cornstarch; add slowly to hot milk. Cook in double boiler until thick and cornstarch is well cooked, or about 40 minutes. Pour onto 2 egg yolks, beat well, and return to double boiler. Cook about three minutes. Cool and add 1 c. well-drained grated pineapple and $\frac{1}{2}$ t. vanilla. Pour into a baked pie crust and cover with meringue made of 2 stiffly beaten egg whites and 2 T. powdered sugar. Brown in slow oven.

Rhubarb Pineapple Pie

Wash, trim and cut rhubarb into inch pieces. There should be $\frac{1}{2}$ c. To make the rhubarb less acid, place in colander and pour boiling water over it. Add $\frac{1}{2}$ c. well-drained, grated pineapple to rhubarb, together with $\frac{1}{4}$ c. sugar mixed with 2 T. flour. Fill pastry lined pie pan, cover with top layer of pastry and put into hot oven for 10 minutes. Then reduce heat and bake 30 minutes longer. A strip of wet cloth tied tightly around outside rim of pie will prevent juice from escaping. Cloth may be easily removed on taking pie from oven.

Pineapple Turnovers

Roll pie pastry thin and cut in 4-inch squares. On the center of each square place 1 T. of well-drained grated pineapple and 1 T. each of sugar and butter. Moisten edges of pastry and fold into triangle, pressing edges firmly. Fry until brown in deep, smoking hot fat, drain on brown paper, sprinkle with powdered sugar and serve immediately. They may also be baked in usual way in hot oven for 10 minutes.

Pineapple Sauce

To prepare pineapple sauce for puddings, work as follows: Heat 1 c. syrup from grated pineapple. Mix $\frac{1}{4}$ c. sugar, 1 T. flour and $\frac{1}{4}$ t. salt. Add the hot syrup to this, return to heat and bring to the boiling point, stirring constantly. Boil 10 minutes, add 1 T. butter and serve on hot or cold pudding. This sauce makes an excellent dessert when served with left-over plain cake.

Pineapple Tarts

Roll left-over pie pastry to about $\frac{1}{4}$ inch thickness. Cut into circles. From half of these circles cut round centers, leaving a ring of pastry. Moisten the edges of the circles and press a pastry ring on top of each. Bake in hot oven until lightly browned. Cool and heap centers with mixture of well-drained, grated pineapple and powdered sugar, allowing $\frac{1}{2}$ c. pineapple to 3 T. sugar. Serve while freshly baked.

Brandy Tarts

Thoroughly drain 1 c. grated pineapple, add $\frac{1}{2}$ c. chopped raisins, $\frac{1}{4}$ c. chopped walnuts, juice and grated rind of 1 lemon, $\frac{1}{4}$ c. sugar, 3 crackers finely rolled and 1 beaten egg. Roll pastry about $\frac{1}{4}$ inch thick and cut into 6-inch circles. In the center of each put a spoonful of the mixture, moisten the edge with cold water, fold one-half over on other half and press

edges together with a fork dipped in flour. Bake 20 minutes in a moderate oven, or 10 minutes in hot oven and 10 minutes at reduced heat. Serve cold.

Pineapple Roll Cake

Add $\frac{1}{4}$ c. sugar to 1 c. well-drained grated pineapple, heat until sugar melts and set aside while cake is being made. Mix and sift $\frac{1}{4}$ c. flour, $\frac{1}{4}$ t. salt, 1 c. sugar and 2 T. baking powder; add 2 beaten eggs, stirring constantly, and $\frac{1}{4}$ c. hot water. Beat until smooth and spread in a large greased pan of oblong shape. Bake in a moderate oven about 12 minutes. Turn out onto a paper thickly sprinkled with powdered sugar, and spread with the pineapple. Trim off the crusty edges with a sharp knife and roll up like a jelly roll. A strip of paper or cloth may be pinned around it until it cools to keep the roll in shape. Serve cut in slices.

Pineapple Rice Pudding

Add $\frac{1}{4}$ c. rice to $\frac{1}{2}$ c. boiling water and boil 10 minutes. Remove from the heat. Add $\frac{1}{4}$ c. sugar, $\frac{1}{4}$ t. salt, the grated rind of $\frac{1}{2}$ lemon, 1 T. butter, $\frac{1}{4}$ c. seedless raisins and $\frac{1}{2}$ c. grated pineapple. Pour into a greased baking dish and bake in a slow oven until rice is done or about 1 $\frac{1}{2}$ hours. Stir once during the first hour of baking to prevent rice from settling. Serve hot plain or with hard sauce.

Pineapple Bread Pudding

Add 2 c. hot milk to 2 c. stale bread crumbs and allow to stand until cool. Beat 2 eggs, add $\frac{1}{2}$ c. sugar, $\frac{1}{4}$ t. salt and $\frac{1}{4}$ c. well-drained grated pineapple. Combine the mixtures and pour into a greased baking dish. Bake in slow oven until firm or about 35 minutes. Serve with a sauce made from the syrup drained from the pineapple, thickened with cornstarch and sweetened to taste.

Pineapple Fluff

Add $\frac{1}{4}$ c. cold water to $\frac{1}{2}$ T. gelatine. Mix 2 c. hot water, 4 whole cloves and 1 c. sugar. Boil for 5 minutes, add softened gelatine and stir until all has dissolved. Strain, add $\frac{1}{4}$ c. lemon juice and set aside to cool. Remove cloves. When slightly firm, beat with a Dover egg beater until light and frothy. Add 2 stiffly beaten egg whites and beat until thick. Fold in 1 c. well-drained grated pineapple and $\frac{1}{2}$ c. raisins cut in pieces. Pour mixture into a mold and set in cold place until firm. Turn out on a serving dish and serve plain or with whipped cream.

Table of Abbreviations

1 t. equals 1 teaspoonful.
1 T. equals 1 tablespoonful.
1 c. equals 1 cupful.

All Measures Are Level

"My wife doesn't know what she wants."
"You're lucky. Mine does!"—Every-body's Weekly.

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MANY years ago a California fruit-grower planted fruit trees in soil which was shattered and loosened by exploding small charges. The trees matured faster and yielded larger and earlier crops of better fruit than those trees planted in the usual way. Today America's leading orchardists and nurserymen recommend and practice the methods introduced by the California fruit-grower.

Naturally, trees planted in ground mellowed to a depth of five or six feet and fifteen to twenty feet wide thrive better than trees set in a shallow bowl of hard, impervious soil. The root system extends over a wider area thereby obtaining necessary plant food to ensure a vigorous, permanent and profit-yielding tree. The porous soil absorbs the excess surface water so greatly needed in dry seasons, when many young trees die because of lack of sufficient moisture in the soil. Besides improving soil conditions, the blasting method destroys fungus, nematode, and other orchard soil diseases.

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Home-Made Dustless Dusters

MANY long years ago, the feather duster, the dusting brush and the dry cloth were every day articles of the household equipment and were treated with utmost respect. Then, some far-seeing home-maker began to recognize the folly of occupying one's self on cleaning day by chasing dust from one resting place to another, only to move it again the next cleaning day.

Far better is the actual removal of the dirt and dust, which was impossible with the old method. This may be done with the dustless dusters which manufacturers are now placing on the market under many names. But the woman who cannot afford the expense of new dusters frequently may make satisfactory ones at home at little or no expense and with a minimum amount of work.

Cheesecloth Best

Cheesecloth, in one yard squares, is best for these dusters. It is thin and absorbent, has enough body to take up the dust, and may be easily handled. Preparing at least half a dozen at one time will be a saver of both time and effort, and the dusters, if kept in a closed jar, will remain moist for a long time.

The "dustless" preparation, in which

the cloths are to be dipped, is made by adding one teaspoonful each of kerosene and turpentine to a pint of warm water. Mix thoroughly and wring the cloths out of it. Then hang the dusters on the line to dry. The water in the dusters will evaporate, but the small amount of kerosene and turpentine remaining in them will give just the moisture needed to take up the dust.

Dusters Used. Again

Naturally, the dustless life of any duster is limited, since the preparation used on it will take up just so much dust and no more. Then the duster must be washed, dipped in the "dustless" solution, and dried, as previously explained, when it will again be ready for use.

Problems of dusting will be simplified remarkably when the work is done with the dustless cloth. Removal of the dust in this way makes the room really clean, and, at the same time, greatly lightens the daily labor of housecleaning.

Change of Air

McAndrew—Hooray! The wind has changed.

Convalescent Wife—Well, mom, what of it?

McAndrew—Ye ken the doctor said ye needed a change of air.

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Cuts in sizes 16 and 18 years, 36, 38 and 40 inches bust measure. The 36-inch size requires 4 1/2 yards of 40-inch material.

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Cuts in sizes 16 years, 36, 38, 40 and 42 inches bust measure. The 36-inch size requires 3 1/2 yards of 40-inch material.

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Cuts in sizes 2, 4, 6 and 8 years. The 4-year size requires 1 1/2 yards of 40-inch

material with 1 yard of 36-inch contrasting.

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Cuts in sizes 6, 8, 10, 12 and 14 years. The 8-year size requires 2 yards of 40-inch material.

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Cuts in sizes 16 years, 28, 32 and 36 inches waist measure. The 28-inch size requires 2 1/2 yards of 40-inch material.

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Cuts in sizes 16 years, 36, 38, 40, 42, 44 and 46 inches bust measure. The 36-inch size requires 2 1/2 yards of 36-inch material.

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Enclosed find.....cents for which send me the following:

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Pollination Problems in Wenatchee Valley

(Continued from page 10)

trying to sell to the orchardists of the Wenatchee Valley. It may be that we shall have to call upon some professional "flea trainer" to educate our bees, too, so that we may get proper pollinating results. Suggestions have also been made that we try spraying the bloom with a honey spray.

We do know that we will have to depend on the insects to do the work. Mr. Luce put in about three or four weeks gathering and distributing pollen to a few thousand blooms, and it is very obvious that man must enlist the aid of his insect friends to do the job on a big scale.

Wind as a Pollination Factor

No one who has studied the subject thoroughly believes that the wind is an important factor in pollination, although many growers hold this opinion. We have pollinizing grafts set in self-sterile varieties which do not show any effect on the set of fruit in the same tree unless there is a carrying agency. We shall never complain of lack of wind at blooming time. In fact, we are convinced that windy weather at blooming time is almost as much of a deterrent to insect activity as cloudy or cold weather. Whenever windy conditions prevail, the orchardist will probably find his best set of fruit on the warm or sheltered side of the trees. This condition was very noticeable in the Wenatchee Valley last year.

Pollinizing Facts Known

The last chapter in the pollination problem has not yet been written. There are still volumes of facts to be ascertained. Facts may vary in different localities, with various strains of varieties, and under differing situations.

But the need for insect activities at blooming time, the value of a vigorous tree, and the necessity for cross pollinating varieties to secure a good set of fruit in our commercial apples in this district have been well established by Mr. Luce. In the orchard operations of the future, the thinking grower will weigh these factors carefully and govern his actions accordingly.

Fertilize Strawberries for Best Results

THE SIZE and quality of a strawberry crop depends upon the size obtained by the plants during the previous season of growth, according to Prof. J. R. Cooper of the College of Agriculture, University of Arkansas. Fertilizers and culture play an important part in promoting the development of proper size.

The crown of a strawberry plant is formed during the summer and fall previous to the time of fruiting. The number of flowers, and therefore the number of berries which will form, are determined before cold weather arrives. Any fertilizer which is intended to increase the crop must be applied early enough in the season so that the plants can make use of the same.

"In old berry patches cultivation should start in the middle the minute the last berry is picked. Fertilizers should be applied just before the first summer cultivation. This will insure the incorporation of the fertilizers in the soil. A good fertilizer for old beds is 400 pounds of acid phosphate and 100 pounds of nitrate of soda scattered broadcast and cultivated under after harvest. If mixed fertilizer is desired, 400 to 600 pounds of an 8-4-0, or in the South an 8-4-4, fertilizer scattered and cultivated under immediately after harvest will give good results."

Phyllis—When I accepted George, he was in the seventh heaven.

Joan—Quite possibly, my dear, he's been engaged six times before.—London Opinion.

problems in the Valley (page 10)
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Bee Keeping for Fruit Growers



By H. F. Wilson

National Beekeepers' Organization Will Help Beekeepers

ALTHOUGH there are nearly 800,000 beekeepers in the United States, only a few of them are fully informed as to the extent of the industry and the possibilities of the industry if it were thoroughly organized. During the past two years, prices of honey have been extremely low, and it has been impossible for beekeepers to make a living or even secure fair wages from beekeeping. The particular reason for this is that the average beekeeper has no conception of the cost of producing honey and continually sells it at a loss. Most of the side-line beekeepers keep bees mostly for pleasure, reaping whatever benefit they can in a financial way only when they have a salable surplus. When the surplus is large, a so-called over-production occurs.

In order to improve the general beekeeping situation over the entire nation, the American Honey Producers' League made several changes in the constitution at the convention held at New Orleans on January 25, 26 and 27. As a result of these changes, it will be possible for every beekeeper in the United States to become a member of the national organization at the small cost of 12 cents per member. Also, the association will publish a monthly bee journal, the subscription price of which will be \$1 per year, regular rate. But each member of the league will be able to subscribe for this journal at half price, or 50 cents per year. Every beekeeper in the United States can therefore be a member of this national organization and receive the official publication for the small amount of 63 cents.

I believe that this is the most important step in the history of American beekeeping, and every individual beekeeper, regardless of the number of colonies of bees, will find it worth while to become a member of this organization. I am quite sure that the readers of the AMERICAN FRUIT GROWER MAGAZINE will be interested in the work of this organization and I am therefore including a few paragraphs from the constitution:

The American Honey Producers' League

Purpose. — To establish and maintain a truly national organization of beekeepers for the United States by:

- a. Protecting the interests, activities and rights of beekeepers in all lines in any manner not inconsistent with public policy.
- b. To publish and disseminate literature pertaining to bee culture and allied sciences in its practical and scientific aspect for the express purpose of uplifting the standards of beekeeping and lowering the cost of production of honey.
- c. To hold conventions of the membership for the discussion of any and all problems of beekeeping and to aid, encourage and foster beekeeper's meetings, public lectures devoted to beekeeping in schools, colleges and public societies in a manner consistent with paragraph (b) of this section.
- d. To aid and promote research in bee culture, nutrition of honey and honey marketing problems by the United States Department of Agriculture, the state experiment stations and public colleges and universities or any other agency devoted to such research.

e. To assist in every educational and research way possible in the solution of marketing problems of beekeepers, but not to enter specifically into the business of marketing honey or bee supplies.

f. To encourage and stimulate an interest in honey through the promotion of nature study of bees.

Membership. — The membership of the American Honey Producers' League shall consist of two classes, namely, individual members, organization members and life members, as follows:

a. Individual members. Any person of good character who is interested in bee culture or any phase of the beekeeping industry is eligible to membership and may become a member by submitting proper application, accompanied by the required membership fee, and agreeing to be governed by this constitution and by-laws.

b. Organization members. Any association, society or other organization organized in the interests of bee culture or any phase of the beekeeping industry is eligible to membership and may become a member by submitting proper application accompanied by the required fee, and agreeing to abide by this constitution and by-laws.

Fees and Dues. — a. Individual members. The initiation fee for any individual member shall be \$3, which includes the initiation fee and all dues until the following November 1.

b. Organization members. The dues shall be \$3 for every 25 paid up members or fraction thereof over 12 in county and state associations.

Further information and a sample copy of the league publication can be secured by writing to the secretary, C. L. Corkins, at Laramie, Wyo.

The European Corn Borer

IT IS impossible at this time to determine what effect the depredations of the corn borer may have on the beekeeping industry.

When the corn borer has spread over the entire corn belt, which is sure to happen, its presence may prove to be either detrimental or beneficial to the beekeeping industry. However, at the present time, the indications are that no serious damage is likely to occur to beekeeping, and there is a possibility that in the plans for combating the corn borer, the changes in rotation of crops may bring increased plantings of clover. Should this happen, the combined result should be beneficial to our beekeepers.

The feeding habits of the corn borer are such that there seems to be no danger of its attacking our main honey producing plants.

Should the corn borer spread to the South and work on the sugar cane with serious results to the sugar crop, the price of sugar would be sure to advance materially and this would help the beekeeping industry.

Local Publicity Will Sell Honey

GET YOUR local papers to use short articles on honey. Arrange to talk to local service and civic clubs about bees and honey. You will find a widely increasing interest in honey.

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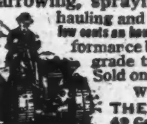


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Baskets for Apples, Peaches, Plums, Grapes, Tomatoes, Cucumbers, Beans, etc. Boxes and Crates for Berries, Cucumbers, Celery, Cauliflower and vegetables of all kinds.

PLANT BOXES

Catalog mailed on request

The Pierce-Williams Co. South Haven, Mich. Jonesboro, Ark.

Protection from Blossom to Basket

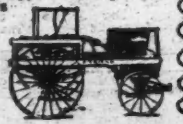
From the moment the buds begin to swell in the balmy days of spring, until the fruit hangs ripe, mellow and juicy upon the tree at harvest time, protection against fruit insects and diseases is necessary.

Over 30 years of experience in high pressure sprayer building is behind "Friend" sprayer construction. This vast experience combined with engineering skill has developed what is today the leading machine for applying spray dope. Scores of "Friends" have given 12 to 15 years of service—then been overhauled and are still going good as new.

NOT A SINGLE "FRIEND" SPRAYER has ever been entirely worn out.

Write today for a copy of our Big Free Catalog, which gives all the details.

"Friend" Mfg. Co.
110 East Ave.
Gaspert, N. Y.



Nitrate of Soda For Fruit

EVERY orchardist knows that he must give his trees a liberal supply of nitrogen every year to get a good crop. The Experiment Stations all recommend Nitrate of Soda for this purpose.

Your home trees should be treated the same way. One pound of Nitrate of Soda to each one inch of tree diameter is the proper amount. Spread it as far as the branches reach out.

Apples and pears do well in sod but the ground under peach trees must be cultivated to get good peaches.

Nitrogen is so universally lacking in practically all of our cultivated soils that it is always safe and profitable to apply Nitrate of Soda to growing crops.

Our pamphlet on fertilizing fruits and gardens will be sent you if you will cut out this advertisement, write your address in the margin and mail to our nearest office.

3633

Chilean Nitrate of Soda Educational Bureau

37 William Street New York, N. Y.

Raleigh, N. C. Montgomery, Ala. Little Rock, Ark.
Columbia, S. C. Jackson, Miss. Nashville, Tenn.
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STANDARD GARDEN TRACTOR
A Powerful All-round Tractor for Small Farms, Gardeners, Florists, Truckers, Nurseries, Estates, Fruit Growers, Suburbanites, and Poultrymen.
DOES A MEN'S WORK
Handle Field Work, Dusting Outfit, Belt Machinery & Lawnmower. Catalog Free.
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ADVERTISING RATES, 15 CENTS A WORD
Write advertisement on separate sheet. Please enclose cash with order. For advertisements addressed in care of this publication, allow 5 words for address.

SPECIAL NOTICE

All advertising copy, discontinuance orders or change of copy must reach the office by the 10th of this month for next issue.

Address

AMERICAN FRUIT GROWER MAGAZINE
53 West Jackson Boulevard, CHICAGO

AGENTS-SALESMEN WANTED

AGENTS-SWORN PROOF \$12.85 DAILY IN ADVANCE. Bonus besides. Introduce finest line new guaranteed hosiery you ever saw. Beats store prices. 125 styles, colors. Amazing new sales plan a wonder. You deliver or we deliver—as you like. Make \$25 a week in spare time. Auto furnished. No capital or experience necessary. Selling like wild-fire. Samples furnished. Write quickly. Wilkint Hosiery Co., Dept. 1904, Greenfield, Ohio.

AGENTS-RIDE IN NEW AUTO. SHOW SAMPLES AND COLLECT \$17.50 CASH DAILY IN ADVANCE. Bonus besides. Finest new line hosiery—129 styles and colors. Guaranteed 7 months. Priced to sell fast and repeat. Permanent business. Big profits. Steady income. Spare time satisfactory. No experience needed. Start on credit. Write quick for samples. Betterkint Textile Co., Dept. 55, Greenfield, Ohio.

AGENTS-NEW PLAN. MAKES IT EASY TO EARN \$50.00 TO \$100.00 WEEKLY, selling shirts direct to wearer. No capital or experience needed. Represent a real manufacturer. Write now for real samples. Madison Factories, 560 Broadway, New York.

EVERYBODY NEEDS FOOD. OUR PLAN GIVES customer better quality and lower prices. Representatives wanted. \$100 a week and free automobile. Write quick. American Products Co., 9093 Monmouth, Cincinnati, Ohio.

AGENTS-\$60 A WEEK-DRI-KLEAN-IT MAKES any car look like new. Removes mud, grease, tar, all in one operation. No soap or water used. Write for sample. American Accessories Co., Desk 704, Cincinnati, Ohio.

SELL "FIXIT" RUBBER REPAIR. BIG PAY. Doubles mileage of tires and tubes. Self vulcanization without heat or tools. Big season now. Marquette, D2323 Wolfram, Chicago.

WE PAY \$50 A WEEK AND EXPENSES AND give Ford auto to men to introduce poultry and stock compounds. Imperial Co., D-26, Parsons, Kan.

HOSIERY FREE AND \$12 DAILY. SELL NATIONALLY known pure silk hosiery. Amazing values. Experience unnecessary. Free sample outfit mailed immediately. Pure Silk Hosiery Co., 208 W. Monroe, Dept. P-4, Chicago.

FARMS AND ORCHARDS

OPPORTUNITIES IN SOUTHERN CALIFORNIA are better now than ever for the man of moderate means, who desires to establish a home on a few acres that will insure him a good living in a delightful country. Lands are reasonable in price and terms attractive. Crops best suited for different localities are well proved. Efficient marketing organizations are at your service. Southern California has a climate you will like—an enjoyable twelve months' open season. There are thousands of miles of paved roads. Seaside and mountain resorts offer recreation for everybody. Let me mail you our illustrated folder containing dependable information on Southern California. C. I. Seagraves, General Colonization Agent, Santa Fe Ry., 942 Railway Exchange, Chicago.

CALIFORNIA POULTRY AND FRUIT RAISING—If you are interested now, or at some time in the future, in owning a profitable poultry farm, or fruit and poultry farm combined, in southern California, send for a copy of our booklet, "How to Go in the Chicken Business and How to Stay in." California Hotel Farm Company, 18 North Euclid Ave., Pasadena, California.

FOR SALE—128 ACRE APPLE ORCHARD. Young trees in vigorous condition. Bore first fair crop in 1926. Commercial varieties. 1 1/2 miles from this city. \$5000.00 in cash, balance terms. Theo. Ochs, Cape Girardeau, Mo.

CAREFULLY DEVELOPED ORCHARD. SEVEN-ty-five acres in trees. Near Keyser, West Virginia. To settle estate. Inquire F. H. Graeper, Annapolis, Maryland.

NURSERY

1000 GIBSON STRAWBERRY PLANTS, \$4.25: Aroma, Premier, Gaudy, Wm. Belt, Marvel, Eaton, Glen Mary, Brandywine, \$5.50; 100 Gibson, \$1.25 postpaid; 100 Champion Everbearing, \$2.00 postpaid; 50 raspberries, \$2.00; 10 grapes, \$1.00; 100 Concord grapes, \$5.50; 100 asparagus, \$1.25; 20 Gladioli, 60c; 25 packets vegetable and flower seeds, \$1.00. Catalog. O. Kiger Nursery, Danville, Iowa.

STRAWBERRY, \$3 to \$3.50—1000; RASPBERRY, blackberry, grapevines. Wholesale prices. Cloverleaf Nursery, Three Oaks, Mich.

CUMBERLAND RASPBERRY PLANTS, TWICE-inspected. Strong and vigorous, no systemic diseases. \$11 per 1000. \$6 for 500. Peters Nursery, White Hall, Ill.

GUARANTEED GRAPE PLANTS FROM HIGH-est producing vineyard in Michigan. Concord, Delaware, Niagara. Six each. Dollar prepaid. Local agents wanted. Root & Son, Paw Paw, Mich.

NUTS

NUT GROWING, A PROFITABLE SIDE LINE for the fruit grower. We can supply grafted stock of the easy cracking black walnuts, hardy English walnut, pecans and albertas. Don't miss our illustrated catalogue. John W. Hershey, Nut Nurseries, Downingtown, Pa.

PLANTS

FROSTPROOF CABBAGE PLANTS, BERMUDA onion plants, hardy field grown tomato plants.

Grow the Trees Yourself

Editor, AMERICAN FRUIT GROWER MAGAZINE
We live about 60 miles from Omaha along the foothills about two miles from the Missouri River. An agent is working here trying to get people to plant apples on some of the rough land that is not suited for farming. He offers to set out the trees and prune them for three years at \$30 an acre. The owner of the land is to do the cultivating.

I feel that our climate and soil are excellent for apples, but I should like to know about the marketing situation. How much acreage should there be to attract buyers? Would an orchard of 10 to 20 acres be sufficient?

At what age do the trees begin to bear and what yields might one expect? Is there enough demand so that one can be reasonably sure of marketing at a price that would pay for the work?—R. G. T., Nebraska.

ANSWER: I believe you could grow apples successfully in your locality. However, it might be a good thing for you to get in touch with your experiment station and get the opinion of these authorities. I suggest that you write to Prof. R. F. Howard, chairman of the Department of Horticulture, University of Nebraska, Lincoln, Nebr.

I do not believe it advisable for you to buy the trees under a contract whereby the agent would prune them for three years. Rather than do this, you should study pruning yourself and then do the work according to the best known methods. An outside party would not take the interest in the trees that you would take and which should be taken in the early life of the trees, and I do not believe you would obtain such a good orchard as you would obtain if you attended to the trees yourself from the start.

In a new locality like yours, I think that you should try to get enough growers interested so that you could form a good local co-operative association. For this purpose, you would need a sufficient acreage to produce at least 50 to 100 cars of fruit a season. This would be sufficient tonnage to attract buyers and you could also develop methods of handling and marketing the fruit that would prove helpful to you all around. You could save money in handling the fruit and you could without doubt get better prices for it. Another advantage of undertaking the proposition on a co-operative basis from the start is that you could then

decide on a few varieties. When individual growers operate alone, they usually plant a large assortment of varieties. It is difficult for any co-operative association which is organized later to handle and market such products effectively. By organizing at the start and by standardizing your varieties, you will have ideal conditions for the operation of a very effective co-operative.

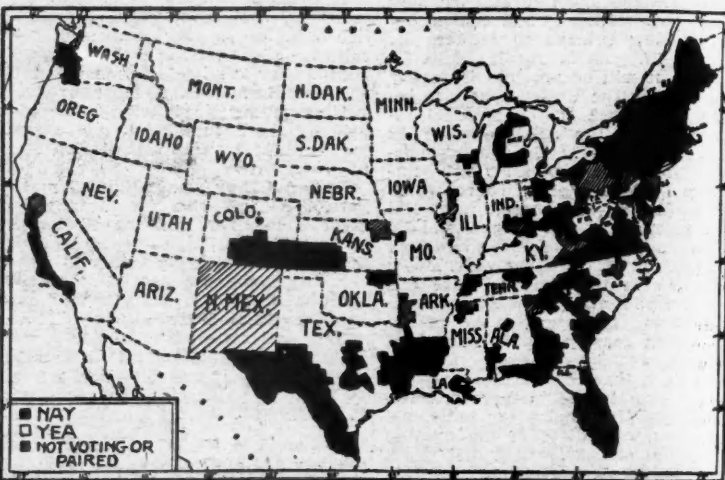
A single orchard of 10 to 20 acres would not, in my opinion, be sufficient to attract outside buyers.

Apple trees of many varieties begin to bear at about eight to 10 years of age, but most of them do not reach full bearing until they are 15 to 20 years old.

Under favorable conditions, you can probably figure on a crop of 200 to 300 bushels per acre a year. Under particularly favorable conditions some growers occasionally obtain 500 to 1000 bushels per acre per year. Of course, in some seasons, frosts and other conditions might occur and in such instances you might not get a good crop at all. I think that if you plant good varieties and give your trees good care from the start you will not have any difficulty in finding a market for your product at profitable prices.

Line-up on Farm Relief

THE MAP presented with this article shows how the representatives in Congress lined up on the farm relief bill. It shows clearly that the chief opposition came from the industrial sections of the East and from certain sections of the South. Aside



from the East and extreme South, practically the remainder of the country supported the measure. The map also shows that a few states supported the bill, while states partly or wholly surrounding them opposed it.

Co-operative Promotes Use of Bees

SINCE Lee S. Turner was engaged as apiarist by the Eugene Fruit Growers' Association of Eugene, Ore., two or three years ago, association members who keep bees—and many of them do—have come to think of them as pollinizers rather than as producers of honey and when it comes to dollars-and-cents return from their efforts, doubtless the insects are many times more valuable in that capacity. Several varieties of cherries popular in Lane county are both self and inter-sterile, and their proper pollination, not to mention that of apples and pears, became a large problem in the district. To aid in solving it, Turner, who had studied apiculture at Oregon Agricultural College, was given carte blanche in the matter; and now he has a regular round of visits, inspecting bees and giving advice as to their care under a special contract, charging \$1.25 each for the first five hives, 75 cents each for the second, and 50 cents each for all over 10. Some service also is rendered non-members, they being charged 75

cents per hour—and mileage unless they are on the regular run. Foul-brood has been just about eliminated; more than 400 Italian queens have been introduced; the association has added a bee supply department through which its members are accommodated; and nobody knows what value to put on the bees' efforts at pollination. Association sales run well over \$1,000,000 annually, and the net cost to growers of Turner's work is only \$600.

Pear Growers Making Progress

THE CALIFORNIA Pear Growers' Association of San Francisco has grown from 257 members when it was organized nine years ago to over 1300 members in 1926. Its members produce two and one-half times as many pears as did the members in 1917. Many members have young orchards which are still to come into bearing. Heretofore the association has been able to sell all of its canning pears to local canneries, but the 1926 crop met the requirements of all of the California canners and made necessary the shipment of more cars in the fresh state than in 1925. Some pears were dried but sales were unsatisfactory.

Some advertising has been carried since 1917 but unusual efforts were made the past season to increase consumer demand. The association advertised in New York, Chicago, Detroit, Philadelphia, Minneapolis, St. Paul and Los Angeles. Newspaper advertisements were accompanied by displays of fruit in windows and on

the walls of the better fruit stores both in the large cities mentioned and in the smaller towns and cities within a range of 50 miles.

This advertising, it is believed, did much to increase consumption. Expenditures for advertising amounted to \$47,583. Income from commissions for the year amounted to \$110,694. The reserves of the year amounted to \$125,632.

Effect of Spraying on Keeping Quality of Citrus

A NEW BULLETIN will soon be issued by the United States Department of Agriculture which will be valuable to citrus growers, especially in Florida. The bulletin is entitled, "The Effect of Spraying with Fungicides on the Keeping Quality of Florida Citrus Fruits." The authors are H. R. Fulton, F. A. Wolf, J. J. Bowman and W. J. Bach of the Bureau of Plant Industry. Copies of the bulletin will be sent as soon as the bulletin is off the press to those who mail their addresses to the Department of Agriculture, Washington, D. C.

Spread farm manure broadcast as soon as possible after it is made and work into the soil promptly. Allowed to lie in piles for even a short time, it loses much of its nitrogen and organic matter.

Engineering for the Fruit Grower

By E. W. Lehmann

A Problem in Waste Disposal

THE FOLLOWING inquiry suggests a type of sewage disposal problem that is likely to be rather common if due care is not observed in constructing a proper drain and installing an adequate disposal tank.

"We have a cesspool for the kitchen waste water, and a second cesspool for the bathroom and toilet. These have been in operation for 17 years. The kitchen cesspool is connected direct to tile, with which we always have trouble due to its choking and filling up. Would a septic tank overcome this? Our water supply is from an artesian well, so we feel safe about it."

Cesspool Is Dangerous

I should always advise against the use of a cesspool on general principles. The cesspool is merely a place where the waste material is discharged out of sight, with the hope that it will seep away in the adjacent soil without spoiling a water supply. The fact that you have an artesian well assures that you are in no immediate danger; however, if there were shallow wells nearby, the chance of contamination would be rather great. The septic tank is always more desirable than the cesspool, because it is constructed with tight sides, and a certain bacterial action takes place which partially purifies the waste material and renders it in condition so that the discharge from the tank can be disposed of without any great difficulty.

The stoppage of the tile line between the house and the cesspool may be due to one of several reasons. In the first place, the drain may not be properly made. A sewer drain made of ordinary farm drain tile is not satisfactory because the waste water will seep through the joints of the tile and allow the sediment to settle out, thereby stopping the drain. Drain constructed to carry sewage should be constructed of either regular sewer tile with cemented joints, or of cast iron soil pipe with properly leaded joints. Always provide as much fall as conditions will permit.

The cause of the drain pipe stopping up may have been due to the waste water flowing out into the drain in small quantities. Under farm conditions it is desirable occasionally to run large quantities of water through the drain pipes so that they may be flushed out. In addition to cleaning the pipe, this extra water merely dilutes the sewage without having any detrimental effect on the action of the septic tank.

Both federal and state experiment stations have directed attention to this phase of the farm sanitation problem, and it is well to take the matter up with them relative to the proper plans of a septic tank for a particular condition. A great many of the commercial septic tanks on the market are entirely too small to render service over a term of years without giving considerable trouble.

Pumping Water to Storage Tank

A COUNTY agricultural agent in a fruit section presents this problem for solution. A pond is located at the base of a hill and is filled by the drainage run-off from five acres of land. It is proposed that a circular concrete storage tank with bottom diameter of 20 feet, side slope of one to one, or top diameter of 30 feet, and a depth of five feet, with a capacity of approximately 20,000 gallons, be located 1200 feet away, and about 80 feet higher than the pond. It is proposed to have two filling spouts for spraying work, one to be between the pump and the

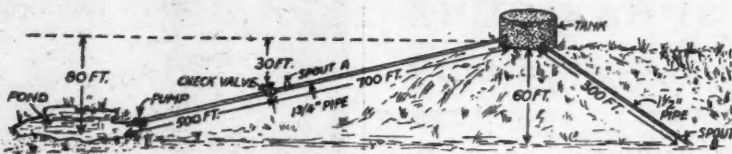
tank, about 700 feet from the tank and 30 feet below, which we will call A, and the other one is to one side of the tank, 300 feet from it and about 60 feet below, which we will call B.

It is desired to know the size pipe to deliver 25 gallons of water a minute at each spout; also the proper size engine to use in pumping.

Proper Sized Pipe

There are several factors that influence the flow of water through a pipe. The two important things are: the resistance to overcome in the pipe and the pressure available, and the head of water, or the height it is stored above the point of delivery. By calculation or the use of tables, the quantity flow through different sized pipes may be determined. It was found that a one and one-half-inch pipe 700 feet long with a fall of 30 feet or a fall of one foot in 24 will deliver only a little more than 15 gallons per minute to spout A. The same size pipe 300 feet long with 60 feet of fall, or a fall of one foot in five, will deliver more than 30 gallons of water per minute through spout B.

If it is felt that 15 gallons per minute at spout A is not sufficient, then a larger pipe must be resorted to. Further calculation shows it would require a one and three-fourths-inch pipe to deliver water to spout A at a rate of 25 gallons per minute. The installation should then be made with 1200 feet of one and three-fourths-inch pipe between the pump at the pond and the tank. Provide a check valve



Diagrammatic sketch of plan for making use of water from a pond for spraying, as described

just below the point where pipe for spout A is connected to the main line.

Power Required

The horsepower required to pump the water from the pond to the storage tank at the top of the hill depends on the rate it is to be pumped. It is necessary to know the capacity of the pump before the horsepower can be calculated. If we assume a pump will be used that will deliver 10 gallons of water per minute, it will give a basis for calculation. Such a pump would deliver 600 gallons an hour, or it would fill the tank by running four days of about eight hours each.

To force 10 gallons of water through 100 feet of one and three-fourths-inch pipe would be approximately the same as lifting it one foot, or to force it through 1200 feet of pipe would be equal to lifting it 12 feet. Since the tank is 80 feet above the pond, the pumping would be equivalent to lifting the water 92 feet in all. Ten gallons of water weighing 83 pounds, when lifted 92 feet in one minute would result in 92 times 83 foot-pounds of work being done a minute, or nearly 8000 foot-pounds of work. This is all very simple when we remember that one pound lifted one foot is always one foot-pound, and that it takes 33,000 foot-pounds a minute for one horsepower. Since it takes only about eight thousand foot-pounds to lift 10 gallons of water per minute under the condition mentioned, then it would take only about one-fourth horsepower. But since our pumping equipment is nearer 50 per cent efficient than 100 per cent, this would be doubled and a one-half horsepower engine would be recommended to use with a pump delivering 10 gallons of water per minute.

With a larger capacity pump, the work would be done in a shorter time, more resistance would have to be overcome in the pipe, and a larger

engine would be needed. There is no question but that an ordinary power spray pump could be used for pumping the water from the pond to the tank. A cheaper outfit would do the job just as well.

Making Sewing Machines Run Easy

DURING Farmers' Week at the Ohio State University, Prof. P. B. Potter each day demonstrated how to clean and repair sewing machines. Hundreds of farm women and a few men attended these demonstrations. From the statements made by Prof. Potter, we are led to believe that the sewing machine is a much abused machine, as far as its care is concerned. An example was given of a machine that had not been cleaned during 37 years of use. Many machines are not cleaned during 25 years of use. Under such conditions, there is small wonder that many sewing machines are difficult to operate.

The secret of a good job of cleaning a sewing machine is to use a paint brush and thoroughly brush a liberal amount of gasoline or kerosene onto all parts of the machine where dust or gummy oil has collected. Extreme caution should always be observed in the use of either gasoline or kerosene to avoid fire. The removal of all particles of dirt, lint and pieces of thread is highly important, and extreme care should be ob-

A One-Pipe Smoker Finds His Tocacco

Mr. Lilenfeld's lone briar is now cool and soothing again, he says

The problem of keeping an only pipe sweet, cool, and soothing has been solved by a Long Island haberdasher.

On the chance that a number of pipe-smoking readers of this publication may be in the same predicament that Mr. Lilenfeld found himself two years ago, we publish his letter for what it is worth:

Richmond Hill, L. I.

Larus & Bro. Co.,
Richmond, Va.

Gentlemen:

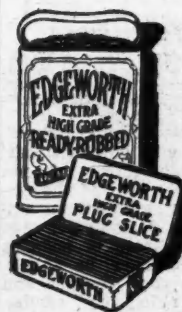
I am sorry I cannot compete with the gentleman who is the proud possessor of 45 pipes of all shapes, forms and makes. I am the owner of one poor solitary pipe.

This pipe I have carried many long years. At times it has been a good pal, soothing me with its cool, mellow smoke; but at other times—Lord, how it could bite! I was at a loss to ascertain the reason why. Every time I changed the brand I would imagine that I had discovered a new find; but when another new tin was bought it was never the same.

Somehow or other I ran across Edgeworth. I believe it was recommended to me at some cigar store. Since I was always ready to take a crack at anything I bought some. What a relief was the first pipeful! The old briar pipe became soothing again. Here surely was a find. I thought to myself "Will it last?" Strange or otherwise it has lasted. I have now smoked Edgeworth for the past two years, and believe me, someone will have to step some to make me switch.

Yours truly,
S. Z. Lilenfeld.

Well, it all comes down to this: The man with forty-five pipes and the man with one pipe are both members of the same Club. Any tobacco that can satisfy these two widely different types of pipe smokers, and the many types in between, is worth while trying—don't you think?



To those who have never tried Edgeworth we make this offer:

Let us send you free samples of Edgeworth so that you may put it to the pipe test. If you like the samples, you'll like Edgeworth wherever you buy it, for it never changes in quality.

Write your name and address

to Larus & Brother Company, 13 S. 21st Street, Richmond, Va.

We'll be grateful for the name and address of your tobacco dealer, too, if you care to add them.

Edgeworth is sold in various sizes to suit the needs and means of all purchasers. Both Edgeworth Plug Slice and Edgeworth Ready-Rubbed are in small, pocket-size packages, in handsome humidor holding a pound, and also in several handy in-between sizes.

To Retail Tobacco Merchants: If your jobber cannot supply you with Edgeworth, Larus & Brother Company will gladly send you prepaid by parcel post a one- or two-dozen carton of any size of Edgeworth Plug Slice or Edgeworth Ready-Rubbed for the same price you would pay the jobber.

[On your radio—tune in on 7.7 MVA.]
Richmond, Va.—the Edgeworth station.
Wave length 266 meters.

Reassurance

Patient—But isn't it a dangerous operation?

Surgeon—Well, out of five such operations generally only one succeeds. But don't worry, madam, I have been unsuccessful with four in succession.

HAYES FRUIT FOG

Here's some more evidence that Hayes Sprayers do even more efficient work than is claimed for them. Read Mr. Colson's letter.

Mobile, Alabama
Sept. 15, 1925

Hayes Pump & Planter Co.
Galva, Illinois
Gentlemen:

The Hayes Sprayer equipped with a Ford Engine which you recently shipped me has just been set up. I have completed my first spraying. This being a new type of spray rig, I have kept an accurate check on the operating expenses and am pleased to give you the following information.

This sprayer was operated over five days in succession, putting out thirty-six hundred gallons of spray dope per day. During this time there was not a single stop or breakdown nor was any attention given to this sprayer. Our saving in five days' spraying was a little over \$50.00 as compared with two other rigs which we have been using for the last several years.

I believe this to be one of the best sprayers on the market and the price is far less than I expected to pay for an outfit in its class.

Yours very truly,
(signed) E. G. Colson, Mgr.
L. L. Noble Statsuma & Pecan Groves

No matter what type or kind of sprayer you need, it is included in the Hayes line (50 different models). Let us tell you more about these nationally used Sprayers and about the 300 lbs. Fruit-Fog Pressure that has made Hayes the favorite for economy and results. Catalog upon request.

HAYES PUMP & PLANTER CO.
809 Sixth St. Dept. 09 Galva, Ill.



WITTE ENGINES

200,000 in daily
world-wide use.

DIRECT From Factory Wholesale Prices—Easy Terms—No Interest. 57 years proves WITTE most durable, economical—burns almost any kind of fuel—Semi-Steel Construction—Valve-in-Head Motor—WICO Magneto—THROTTLING GOVERNOR—LIFETIME GUARANTEE.

FREE CATALOG Describes New Improvements, New Low Prices and Long Terms. Also Log Saws and Pumps.

WITTE ENGINE WORKS

2141 Witte Building, KANSAS CITY, MO.
2141 Empire Building, PITTSBURGH, PA.
2141 Witte Building, SAN FRANCISCO, CAL.

SPRAY GUNS



Hamilton's double and single guns take less pressure, have exceptionally wide spread—carry farther, are better and cheaper. Dealers and agents wanted.

W. L. HAMILTON, Bangor, Mich.

KINKADE GARDEN TRACTOR and Power Lawnmower

A Practical, Proven Power Cultivator for Gardeners, Suburbanites, Truckers, Florists, Nurserymen, Fruit Growers, Country Estates and Poultrymen.
American Farm Machine Co.
1034 23rd Ave. S. E. MINNEAPOLIS, MINN.

Nitrogen Fertilizers

EDITOR, AMERICAN FRUIT GROWER MAGAZINE: Will you kindly give me advice regarding the fertilizing of my trees with nitrate of soda or sulphate of ammonia.—S. H., Pennsylvania.

ANSWER: Nitrate of soda and sulphate of ammonia both are carriers of nitrogen. The nitrate of soda contains about 16 per cent of the element nitrogen and ammonium sulphate contains about 20 to 21 per cent of nitrogen. The nitrate of soda is probably a little quicker in action, particularly in the cool weather and cool soil prevailing in early spring. However, in practice growers have been getting excellent results from ammonium sulphate. It seems to me that it is a question largely of relative cost of the nitrogen carried by the two forms. Some authorities have advanced the theory that cumulative damage follows the use of ammonium sulphate, but it seems to me that more proof is needed on this matter before growers draw final conclusions regarding it.

Nut Tree Propagation

EDITOR, AMERICAN FRUIT GROWER MAGAZINE: I have been reading your articles on propagation and was disappointed to find nothing about pecan grafting. I should like to know how such grafting can be done on medium-sized seedling pecan trees. Can I take scions of the Stuart or Success and topgraft them into the limbs of this seedling with the same methods as are used in grafting apples? If not, please advise me how the work should be done.—C. H. W., Arkansas.

ANSWER: Pecans and other nut trees are propagated according to the same principles as fruit trees.

However, the nut trees are rather difficult to propagate and special methods must be used with most of them. These methods are described fully in Farmers' Bulletin 1501, copies of which can be obtained from the Department of Agriculture, Washington, D. C. I suggest that you send for a copy of this bulletin and follow the directions given.

Lovely, Leafy Apple Tree

By Alice Crowell Hoffman

Lovely leafy apple tree,
You are very good to me
Guarding me from heat of day,
Giving me cool shade for play;
Music, too, and gentle song
When the breezes come along.
As though this were not enough
All through weather mild and rough
You are growing busily
Luscious apples, too, for me.
Lovely leafy apple tree,
You are surely good to me.

Re-elect Officers

THE SUN-MAID Raisin Growers of California at the recent annual meeting re-elected all the former officers, as follows: Ralph P. Merritt, president; J. M. Leslie, vice-president; Lesley Einstein, treasurer; Clayton I. Chandler, secretary; Jay L. Reed, executive manager and assistant secretary; Harry M. Creech, general counsel; and E. G. Granger, assistant secretary.

An Orchard Storeroom on Wheels

By C. L. Burkholder
Purdue University

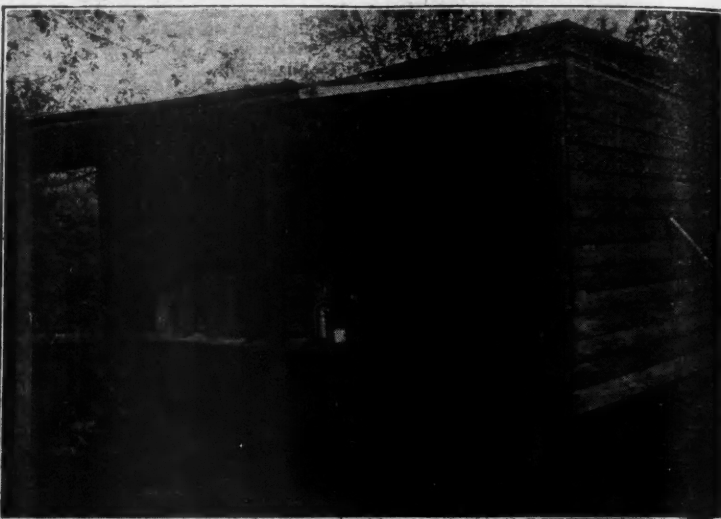
FROM EARLY in the spring until late in the fall there is always work to be done in the orchard and small fruit plantation. Some types of work, such as picking, require a large amount of labor and the use of considerable quantities of equipment. Some sort of provision must be made to give quick protection to these supplies and to pickers in stormy weather. In case the orchard is small, this can be easily done by erecting a small permanent shed or storehouse. If the area to be handled is rather large, such a building makes an excellent storeroom for extra equipment and packages but will not provide quick rain protection to more than a small area immediately adjacent.

A very successful solution of this problem has been worked out by Coffing Brothers of Silverwood, Ind. They built a small shed about seven by 16 and six feet high and mounted it on an old low-wheeled wagon. The framework of the building was made heavy enough so that it was possible

to merely hinge on three sides of the building. When occasion required, all three sides could be raised and propped up so as to give protection to a large crew of pickers or stacks of packages. When the picking operations advance to another section of the orchard, a team is hitched on to the shed and it is easily and quickly moved to the new location.

Any man with average ability can construct such a building. Little or no new materials are needed in the construction, and the work can be done inside during bad weather in the winter.

Such a building is also handy for the storing of spray materials during the entire spraying season. The continual transportation of small tools, such as pruning saws, pole pruners, etc., from the main buildings to the orchard can be largely avoided. Dozens of uses will be found for the shed on wheels once it is made a permanent part of the farm equipment.



A shed on wheels that can be easily pulled to any part of the orchard where spraying, picking or pruning operations are being carried on

Auvel Opposes Further Reclamation

EDITOR, AMERICAN FRUIT GROWER MAGAZINE: I have been turning over in my mind the remark you made in your letter about my attitude on new irrigation projects. As I understand it, you were surprised that, being a westerner, I am opposed to new developments of this character.

If you think I am the only man in the West who is opposed to exploitation of farmers in the name of development, let me put you right at once. The great mass of farmers are opposed to new and unnecessary competition of this kind, which is making unbearable conditions worse than they are. These farmers are slow to assert themselves and when they do, their viewpoints do not receive the attention from the public press that the views of promoters do.

I do not wish to be unjust or to harm anyone. There are many who honestly believe they are working for the best interests of the community by promoting such projects. Such persons, however, are out of their place when they take a hand in formulating the policies of agriculture. What would they think if we farmers and fruit growers were to promote the setting up in towns of twice as many bankers, merchants, doctors, lawyers and politicians as now exist without providing more customers and clients?

I am opposed to the opening up of new lands to agriculture just now because for the past six years there has not been enough profit on farm products to pay for the fertilizer value which the products have taken from the soil. It is a crime against conser-

vation to promote development of reclamation projects under these conditions. A policy of wasting the gift of our Creator for future generations is not justified.

When the dirt farmer and not the promoter farmer determines the policies of agriculture, when only sufficient food is raised to feed the hungry, and when the producer's dollar is worth 100 cents, then it will be time enough for the promotion of new irrigation and reclamation projects.—J. H. Auvel, president, Wenatchee District Co-operative Association.

Community Paint Sprayers

By E. W. Lehmann

"MODERN invention has added another to the constantly growing list of services for farm folk. The machine consists of an air compressor, a paint reservoir and a specially devised nozzle and hose connection. It is figured that painting may be done in about one-eighth the time required to do it with a brush. The machine is especially adapted to rural communities where time is short and painters are scarce.

"Here is a good opportunity for community ownership of a spray painting outfit when the work on a single farm is not sufficient to justify individual ownership. It is said there are more than 100,000 of these machines in operation. They are represented to paint more uniformly than the brush, also the coat is heavier and hence the work is more durable. The value of keeping all the buildings painted is recognized and if these machines will cut labor costs by 50 per cent or more, a real service will be performed."

Topworking Unprofitable Sweet Cherry Trees

(Continued from page 9)

narrow strips and applied by starting below the incision and wrapping around the branch, slightly lapping the edge of the material at each turn, and continuing upward to a point above the incision. The bud, of course, must not be covered with the wrapping material. The end of the cotton bandage should be fastened down firmly either with a small tack or by inserting it under the last lap and pulling tightly.

Coat Buds with Parawax

The use of melted parawax as a coating for buds is a recent development and an important factor in securing a good set of buds. The wax should be quite hot so as to flow easily and form a thin film over the bud and wrapping material above and below the bud. The best temperature has not yet been determined, but it is believed that a temperature of 170 degrees Fahrenheit would not be too hot. A good practical rule to follow is to have the wax completely liquified but not smoking hot. A grafting lantern or a small oil stove are suitable for keeping the wax warm. When a lot of waxing is to be done and no grafting lantern is available, it would be advisable to have the wax in two cans, one on the oil stove and one to use in waxing. As soon as the wax begins to cool and get thick, change for the warm can on the stove. The wax may be easily applied with a small paint brush.

Waxing Prevents Desiccation

With reference to the use of parawax, it should be explained that part of the budding had been done before it was decided to apply parawax. As a matter of fact, the idea occurred to me while budding in 1924, but I hesitated to use it. Prof. B. S. Pickett of Ames, Ia., stated that this material had been successfully used by a few nurserymen in his state. Encouraged by this favorable report, we proceeded to wax all buds and to recommend its use by others. The results were so entirely successful that there is now no hesitation in recommending this material in cases where it is difficult to get a good set of buds by the ordinary methods. In experiments conducted at the experiment station, a set of 94.6 per cent was secured on trees where wax was applied, while on check trees only 56 per cent set. In orchards in which the work was properly done by the growers, very good results were also secured where wax was applied, but where none was used or when buds were accidentally missed, a poor set was noted.

Leave Wrapping Material on Over Winter

In conformity with the usual custom, we began to remove the wrapping material from the trees in about three weeks after the buds were placed. It was soon noticed, however, that the edges of the incisions began to curl back and thus expose the bud. The removal of the wrapping was therefore discontinued and the material was left on over winter. Early in the spring just before growth started, the waxed cotton was removed, and the budded branches were cut back a few inches above the topmost bud set in the preceding summer.

An examination of the trees from which the tying material had been removed in autumn showed that fewer buds came through than on trees in which this material was left on over winter. No definite figures can be quoted on this point, but enough trees were observed to indicate that the buds benefit by some protection during the winter in Ontario at any rate.

Results for 1925

The experimental work done in 1925 was much more satisfactory than in 1924. This was probably due to the use of waxed cotton in tying the buds and to the protection afforded the buds through the use of parawax.

There were only two orchards in

which budding was done in both 1924 and 1925, and in these orchards the set of buds was at least 400 per cent better in 1925 than in 1924.

Some Reasons for Buds Failing to Grow

In cases in which the buds failed to grow during 1925, the failure was found to be due to such factors as removing the wrapping material too early in the season, the use of very small budwood, leaving too much wood under the bud, neglecting to coat the buds with parawax, making too large incisions, or unwinding of the wrapping material before the buds had time to set. In orchards or on individual trees where none of these adverse factors operated, the results were very good indeed. In some of the orchards in which the work was done according to our instructions by the growers, the average set was over 75 per cent. When it is taken into account that about three times as many buds were placed as would be needed for the new top, it can readily be seen that these trees are in a good way to produce a new and better top.

Grafting Experiments in 1926

The favorable effects of parawax on buds seemed to indicate that it would be suitable for scions. A number of cherry trees were therefore grafted in the spring of 1926 and the scions were well coated with liquid parawax over the entire surface. The results from this treatment were very good indeed. In one orchard, 12 small trees were grafted by the cleft or whip method on the trunk or small branches, and a good stand was secured on eleven trees. The tree that failed had only one scion, and this one was a Bing, a variety that seems hard to bud or graft. In another orchard, a medium-sized tree was grafted with 20 scions, 18 of which grew nicely.

The favorable results from our own experiments in using parawax as a coating for scions, combined with equally favorable results of a few growers who also used parawax on their scions, indicates that this material will be an important factor in helping to get a better stand of scions in grafting the sweet cherry.

Summary

1. Sweet cherries may be topworked either by budding or grafting, but the results of our experiments and the experience of others indicate that budding is the better method.

2. On small or medium-sized trees with foundation branches not more than two inches in diameter the buds may be placed directly on these branches. For branches of one-half inch to two inches in diameter, the shield bud method gives good results.

3. Trees above medium size should first be forced into a vigorous state of new growth before budding. This may be accomplished by rather heavy heading back, followed by soil cultivation until midsummer and an application of nitrogenous fertilizers just before growth starts. Nitrate of soda is suitable for this purpose and should be applied at the rate of five to 10 pounds per tree according to size and condition. Very large trees in sound condition would require more than the latter amount.

4. After a vigorous new growth has been obtained, the best of these shoots should be budded by the plate or shield bud.

5. All buds set by either the shield or plate method should be tied in position with waxed cotton bandages of one-third to one-half inch width. Special care should be taken to fasten the upper end firmly, either with a tack or by inserting the end under the last lap.

6. Paraffin wax in liquid form should be applied over the bud and on top of the wrapping material on the side where the bud is placed. This will prevent drying out of the bud and will help to secure a higher percentage of takes.

7. In setting buds, place two or three times as many as will ultimately

Protects ORCHARDS VINEYARDS SHADE TREES

Against Climbing Insect Pests



TREE TANGLEFOOT

CLIMBING insects cannot cross a band of Tree Tanglefoot—a sticky material applied in narrow bands to the trunks of trees and grapevines. It is especially recommended against Climbing Cutworms, Canker Worms, Gypsy, Brown-tail and Tussock Caterpillars and Ants.

Outlasts all Substitutes

One pound makes 12 lineal feet of band three-inches wide. It remains effective three to four months, *outlasting all substitute materials from 10 to 20 times.*

Tree Tanglefoot is quickly and easily applied with a wooden paddle. For tree surgery nothing equals this material. It waterproofs crotches, wounds and cavities when nothing else will. Leading horticulturists everywhere endorse it. Seed, hardware and drug stores sell it. Prices: 25-lb. pail \$11, 10-lb. can \$5.25, 5-lb. can \$2.75, 1-lb. can 60 cents.

An illustrated book on leaf-eating insects sent free on request

THE TANGLEFOOT COMPANY
GRAND RAPIDS, MICHIGAN

be needed. This will allow for any casualties and will help to produce plenty of growth for the new top.

8. As a rule, it is better to set the buds on the sides of the branch rather than on the top or bottom.

9. Wrapping material may be left on until the following spring and then removed.

10. Branches on which a fair number of buds have taken should be cut back a few inches above the topmost bud of the scion variety early in the spring. After the buds have made a few inches of growth, cut back again close to the upper or best shoot.

11. After the scion branches have become well established, all other growth on the stock should be removed, to give the new top the best chance.

12. Grafting by the cleft or whip method may also be used with some success provided the scions are coated with a thin film of parawax.

13. Better results are secured in grafting when the grafts are placed on branches ranging in size from one-fourth inch up to two and one-half inches in diameter. Large branches do not graft easily and require more time to heal over.

14. Grafting should be done early in the spring before any growth starts. The time varies with the latitude and altitude, but in Ontario, the best season seems to be late March or early April.

Preparedness

Willie—What did I learn today, teacher?

Teacher—Why do you ask?

Willie—They'll want to know at home.

"Have you any difficulty meeting your expenses?"

"Not a bit. I'm always running into them."—London Opinion.



CLEAN PEARS

Growers are finding a new solution to the double problem of pest control and spray residue by the use of Volck instead of arsenate of lead in their cover sprays.

Volck kills by contact and not by poisoning, ending the problem of spray residue by ending the use of objectionable material.

Controls codling moth by killing both eggs and worms and acts for some days as a repellent in preventing further egg-laying on sprayed surfaces.

Also highly effective against pear psylla, San Jose Scale, and many other insect pests.

Volck has a margin of safety heretofore unknown in contact sprays and marks a definite advance in summer control of insect pests.

Write for new booklet "Codling Moth Control" by Dr. W. S. Regan.

California Spray-Chemical Co.

204 Franklin St., New York City
Watsonville, Cal.; Chicago; Portland, Ore.
Orlando, Florida; Yakima, Wash.

VOLCK

"The Scientific Insecticide."

Profitable Poultry

By Ralston R. Hannas

Turning Off the Lights

THIS is the season for turning off the lights in the laying house where lights have been used during the fall and winter to increase egg production. Some poultry keepers have their lights all turned off by April 1; others do not have them off until April 15. No matter when they are turned off, they should be shut off gradually. The general practice is to take 10 minutes off the lighted period each day; if early morning lights are used, they are turned on 10 minutes later each morning until the birds are gradually worked off them; if evening lights or the evening lunch method of furnishing lights are used, the lights are shut off 10 minutes earlier each evening until they are completely off.

When the lights have been completely turned off, the extra grain feeding, of course, need not be given. The birds' weight should be watched carefully, however, as many of them may be rather light after going through a heavy laying season. No further egg production should be forced just now, that is, there should not be any effort made to increase mash consumption. There may be a slight molt. Feeding at least 13 pounds of grain per 100 birds per day will help to maintain body weight. It is also a good plan to feed cod liver oil at the rate of two per cent of the amount of mash fed to help keep the birds in good condition. They should get this oil for at least three weeks after the lights have been turned off. Let them run outside, if they are not already running out now.

In trying to get those birds back to proper body weight that need it, care must be taken to avoid getting the flock as a whole too fat. Proper regulation of the grain feed and watchfulness on the part of the feeder will take care of this, however.

Broilers, Fryers or Roasters?

IT IS a little early yet, perhaps, to begin thinking about marketing broilers from flocks hatched in the normal hatching season. However, there are several points to be considered in this connection that might very well be thought of at this time. If the flock that was hatched is sufficiently large enough that there is a surplus of broilers beyond what is needed on the home farm, these broilers must be disposed of in some profitable manner. In many cases, a satisfactory home market is not at hand, and one naturally thinks of shipping these broilers.

Many farmers ship these broilers blindly, that is, they do not know the dealer to whom they are shipping; they do not know what outlet this dealer has for the kind of product they are shipping him; they do not know what he will pay or on what he bases his payments; and they do not know whether or not he really wants to handle this class of product. The farmer should, therefore, get in touch with the dealer to whom he is thinking of shipping and find out all about the matter first, before anything is sent. This will eliminate any misunderstanding, and while, of course, the market may fluctuate in the course of a few days, the shipper will know just what the dealer wants in the way of size and can plan his shipment accordingly.

He may find that it will pay him to hold over some or all of his broilers until they reach the fryer stage or even the roaster stage, thereby netting him a better profit rather than a loss, which is likely to be the case if he ships his broilers at a time when

there are a great many on the market. By getting in touch with his commission man or dealer beforehand, he can find out much valuable information. Unless he has had dealings with this commission man before, it will pay him to have the business standing of this man or firm looked up by his banker, who will be only too glad to render this service. Most commission men want to play fair and do play fair with the farmer, but it is against the occasional unscrupulous man that a farmer must be on his guard. The banker can and will be of service here.

The Hen and Her Chicks

THE PRINCIPLES involved in taking care of a hen with a batch of chicks, are practically the same as are involved in taking care of a brooder full of chicks, except, of course, that the hen sees to the feeding of the babies herself to a large extent. However, a comfortable coop must be provided. The ordinary A-shaped coop is very satisfactory, for it will house comfortably one hen with a brood of 25 to 30 chicks. This is as many chicks as one hen should have, although some hens have handled nearly double this number at one time successfully. This is not to be advised, however.

A slatted front that will allow the chicks, but not the biddy, to go out, should be provided for the first week or so, and the feed for the chicks should be out of reach of the mother hen. The same system of feeding can be used as in artificial brooding. After the first week, the hen can be allowed to leave the coop and take her brood with her. If the ground is particularly wet, however, she should be shut in until it dries up somewhat. She should have access to a good-sized patch of green grass, as greens are needed by the chicks. Fresh water in pans near the coop and mash in small hoppers must, of course, be provided. When the chicks are old enough to take care of themselves and do not require any more heat, they should be removed to a larger coop, and the hen should be sent back to the laying pen.

Chick Pests

THERE are all sorts of troubles that one has to contend with in brooding and rearing chicks, some of which are under the control of the one doing the brooding and some of which are not within his control. Take some of the common pests, for instance: rats, hawks, crows, weasels, cats and dogs. These pests are not under the control of the farmer, for they frequently attack when least expected.

However, he can take precautions against these pests before they attack rather than wait until after. He can, for example, watch carefully to see that there are no holes in the floor of his brooder house that rats can get through; he can see that the small chick exit door is closed after dark each night so that small animals cannot enter during the night or early morning hours before he gets out to the brooder house and kill at will; he can see that no stray dogs or cats are permitted on the place; and he can see that the fence around his brooder yard is secure. A precaution against crows and hawks, where these pests prevail, is to stretch strings or wires across the yard and at intervals the narrow strips of white rags about a foot in length to these strings or wires. Some crop growing in the yard in which the stock is running will serve as protection. Asparagus is a mighty good crop for such a purpose, as it will permit the youngsters

to hide from the hawks and give them a chance to escape.

It is mighty discouraging to raise a nice bunch of chicks up to several weeks of age and then have them practically wiped out by one or more of the pests mentioned above. Should these pests prevail, the best methods that are applicable to the individual conditions should be applied immediately for ridding the place of the pests. It may mean the use of traps, poisons, gases, guns, or some other method. The precautions already given will help greatly to prevent losses.

How Much Do Your Chicks Weigh?

IT IS always a good thing to have some sort of a guide to go by, especially in raising chicks, so that we can know whether or not our chicks are up to weight, under weight or over weight. They should be checked up every once in a while by weighing a bunch of them to see just how they are doing. The following figures have been compiled by the Storrs Agricultural Experiment Station. They are given for White Leghorns and Rhode Island Reds. The weights of Plymouth Rocks, Wyandottes, and other heavy breeds at a given age can be considered as slightly more than for the Reds.

Week.	White Leghorns	Rhode Island Reds
	Lb.	Lb.
4.....	.38	.36
8.....	1.09	1.22
12.....	1.80	2.29
16.....	2.36	2.90
20.....	2.90	3.68
24.....	3.23	4.29

These weights are all per chick. Cockerels were removed at the end of the eighth week in the case of the Leghorns and the twelfth week in the case of the Reds.

Records

HOW MUCH feed do your birds eat? Are they eating the proper proportions of mash and grain? How much does it cost to feed them? Are you getting enough eggs to pay the chickens' board? These and many other questions will be answered if you will keep accurate records on your flock. It may take a little longer to care for your birds if you have to stop to jot down figures on a record blank in the laying house, but it will show you a lot of things about your flock that you didn't know before.

Nothing complicated is necessary, just a simple record blank showing the day of the month, amount of grain fed, amount of mash (at end of week or month, as desired), cost of grain, cost of mash, total cost, number of eggs produced, price received for eggs, cost of producing eggs per dozen, number of birds in pen, number of birds died and cause, a blank for special remarks. Any other information desired can be included.

These are just suggestions; perhaps you will want to keep more complete records. There is no getting away from the fact that some sort of records should be kept to show what is going on. A poultry keeper who keeps tab on his flock will be money ahead and besides will find out a number of things about his flock he didn't know before.

Spraying During Full Bloom Detrimental to Honeybees

EVER since fruit trees have been sprayed with arsenicals beekeepers have been much interested in the effects of the practice on the mortality of honeybees. They have long felt that many bees were poisoned as a result of spraying, but until recently few systematic investigations have been conducted to determine whether or not honeybees are actually injured by these chemicals.

In the hope of finding definite answers to some of the questions, so

long debated, the entomologists of the United States Department of Agriculture planned and conducted a series of experiments, the results of which are discussed in Department Bulletin 1364-D, just issued. The investigations, extending over a period of three years, were made along three lines: (1) the effect on honeybees of spraying fruit trees in full bloom; (2) the effect on honeybees of spraying the trees at the customary time, after most of the petals have fallen; and (3) a determination of the minimum amount of arsenic required to kill the bees in confinement.

After one season's work in two states, it was ascertained that spraying during full bloom was detrimental to bees. After three seasons' work on the problem, in four states and five localities, it was determined that spraying at the customary time under nearly ideal conditions was not injurious to the bees; but nearly ideal conditions seldom occur.

The minimum fatal dosage of arsenic per bee, according to laboratory determinations, is between 0.0004 and 0.0005 milligrams.

The subject of poisoning bees is very large and of vital interest, not only to beekeepers but to everyone who is interested directly or indirectly in the growing of crops, including particularly fruit growers, entomologists and plant pathologists, says the department. Of course, the beekeeper does not want his bees poisoned, but the loss of honey is only secondary in comparison with the loss from lack of cross-pollination of flowers. In this respect, the beekeeper, the fruit grower, and, in fact, everyone is benefited by bees.

It is now generally admitted that in using arsenicals as a control for the codling moth the best results are in nearly all cases obtained by applying the first spray after most of the petals have fallen, although in commercial orchards where hundreds of acres of trees must be sprayed within a limited time, it is necessary to begin spraying early in order to finish the work before the calyx cups close. Because the codling moth can be as well controlled by spraying when 90 per cent of the petals have fallen, entomologists recommend spraying at that time rather than during full bloom, especially since it has been definitely proved that spraying when trees are in full bloom is injurious to insect pollinators.

A copy of the bulletin may be secured, as long as the supply lasts, by writing to the United States Department of Agriculture, Washington, D. C.

Control of Pear Thrips

THE PEAR THRIPS is very destructive in some sections of the country. It is a tiny, dark brown insect with a slender, wiry body. Thus it is able to work its way into tightly closed buds, where it feeds on the delicate flower parts and renders them incapable of producing fruit. The thrips usually appears quite suddenly in early April when warm days arrive. At this time, the bud scales are just beginning to show pale areas. According to the New York Agricultural Experiment Station, it is particularly important in combating thrips to apply a spray at the proper time, for failure to make timely application will almost certainly permit a serious attack to develop.

The station recommends spraying the trees with a mixture containing five gallons miscible oil, one pint nicotine sulphate and water to make 100 gallons. Five pounds of whale oil soap may be used instead of the miscible oil, although the oil is preferred. A spray outfit capable of supplying 200 to 300 pounds pressure is essential for effective work, and thorough wetting of the ends of the buds is imperative. In the case of a severe attack, a second spraying three or four days later is advised. The station authorities advise that nicotine be added to the later sprays in order to help rid the orchard of any thrips which may have escaped the earlier applications.

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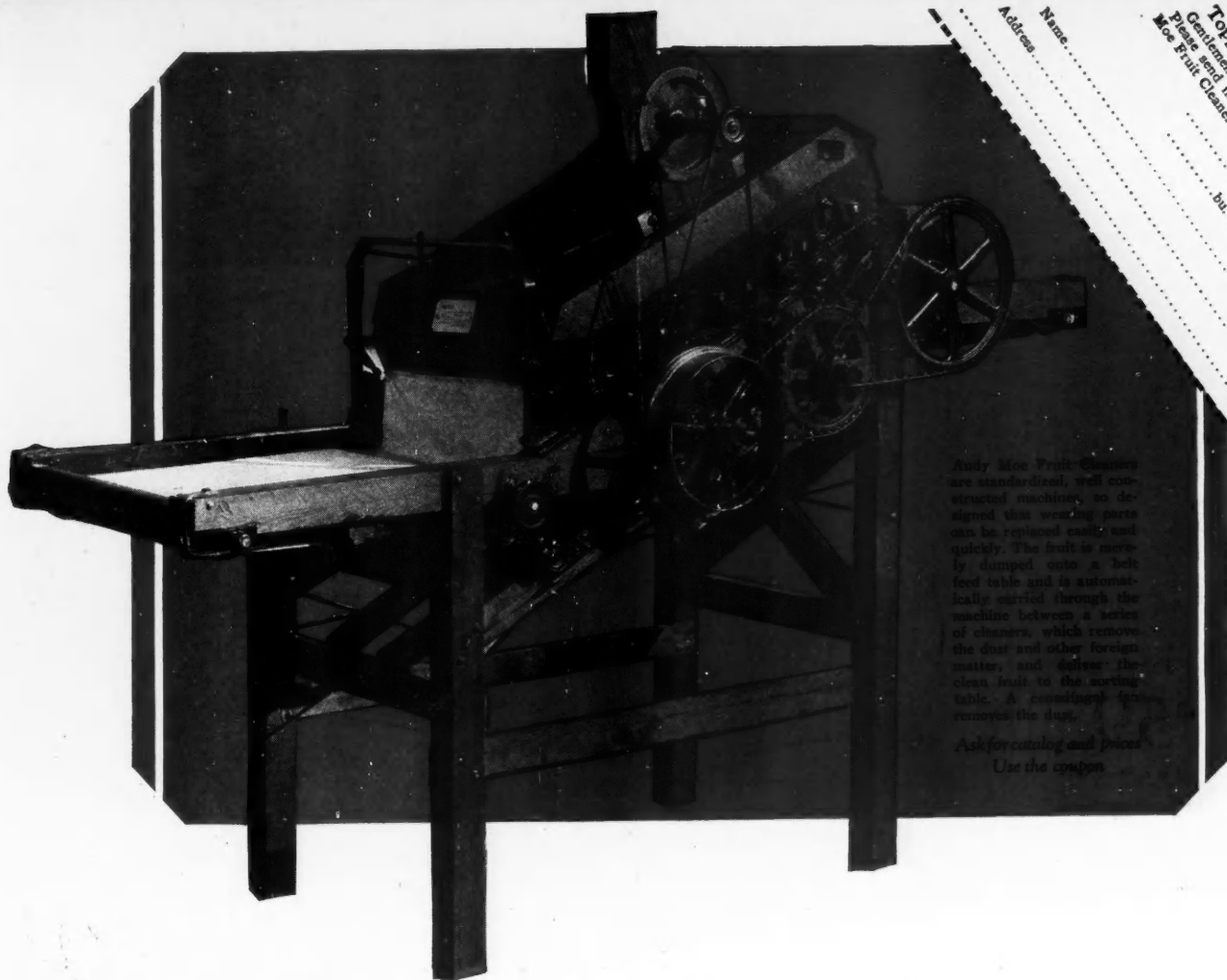
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Andy Moe Fruit Cleaners are standardized, well constructed machines, so designed that wearing parts can be replaced easily and quickly. The fruit is evenly dumped onto a belt feed table and is automatically carried through the machine between a series of cleaners, which remove the dust and other foreign matter, and deliver the clean fruit to the sorting table. A revolving fan removes the dust.

Ask for catalog and prices. Use the coupon.

Moe Iron Works,
Toppenish, Washington, U.S.A.
Gentlemen: Please send information and prices on the Andy Moe Fruit Cleaner. My crop consists of approximately
..... bu. peaches
..... bu. apples
..... bu. pears

ANDY MOE Fruit Cleaners open up new and greater profit opportunities

Alert growers everywhere are cashing in by cleaning their fruit

A new day is dawning in the fruit business—a day when more attention is being paid to the pack itself. Fruit today must not only be grown properly but must be properly cleaned if it is to sell well and bring top prices. Good appearance pays! Andy Moe Fruit Cleaners are the accepted standard machine for cleaning fruit thoroughly but gently. So light is their touch that eggs can be run through the machine without cracking a single shell.

For cleaning apples, pears, peaches, (or what have you?) the Andy Moe offers a method of cleaning that is at once practical and economical. Actual users tell the story better than we can tell it. Read the following extracts from customers' letters. We have literally hundreds of such enthusiastic letters in our files:

"Mighty Pleased with the Work"

We are mighty pleased with the work that our

machines have been doing and irrespective of whether the Health Department wants us to wipe fruit we are going to have these machines. We expect by next season to equip all our graders with Moe Cleaners and you can look forward to an order of about five or six more of them from us.

GARBO FRUIT COMPANY, Sebastopol, Calif.

"Satisfactory in Every Respect"

This is to advise you that we used all last year a wiping machine put out by Andy Moe. This machine is satisfactory in every respect. It cleans the fruit entirely without any injury. We also ran peaches thru this machine which were very ripe without injury to the fruit. It improved them very much, removing dirt and fuzz and bringing out the color, which we think greatly adds to their value.

C. M. HOLTZINGER FRUIT CO., Yakima, Wash.

"Far Beyond our Expectations"

We are more than pleased with your machine as it did the work far beyond our expectations, and to say the least it's a great labor saver, and we will be pleased at any and all times to give you the best references as to the merits of this machine in event you should refer anyone to us.

SCRIBNER & MAYDEN, Sacramento, Calif.

1 1 1

It is time now to be thinking about your 1927 crop. Tell us what your crop will consist of and we will send full facts about Moe fruit cleaners adapted to your own needs. Use the coupon at the top of this page or write a letter now. Address,

MOE IRON WORKS
TOPPENISH, WASHINGTON

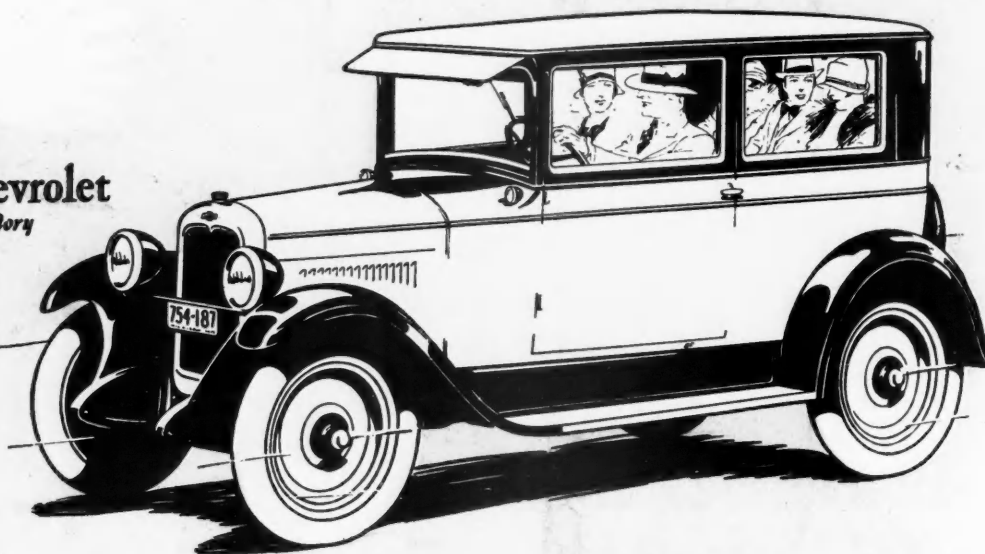
Resident Sales Representatives •• some good territories still open •• write or wire

ANDY MOE fruit cleaners

W I P E R S

W A S H E R S

The Most
Beautiful Chevrolet
in Chevrolet History



The COACH
\$595

f. o. b. Flint, Mich.

More for Your Money than you ever thought possible

Already the Most Beautiful Chevrolet is scoring the greatest success in Chevrolet history! And why? Because no other car of equally low price ever supplied so completely all the attractions and advantages of a high-priced automobile!

... Fisher Bodies whose style, distinction and luxury rival the costliest custom-built creations! ... marks of distinction such as full-crown one-piece fenders, bullet-type lamps and narrow windshield pillars!

... a host of improvements typified by AC oil filter, AC air cleaner, coincidental steering and ignition lock and improved transmission!

All in addition to Chevrolet's already renowned quality features and powerful, smooth performance—and all offered at amazing price reductions!

Here truly is more for your money than you ever thought possible—more than even Chevrolet, with its progressive policies and magnificent factories, could possibly offer, were it not for the economies of tremendous volume production.

Come in—see the Most Beautiful Chevrolet. Drive it. Learn what makes it the greatest value triumph in automobile history—and why it is winning new buyers by tens of thousands each week!



for Economical Transportation

at these low prices!

The Touring or Roadster . . .	\$525
The Coach	\$595
The Coupe	\$625
The 4-Door Sedan	\$695
The Sport Cabriolet	\$715
The Landau	\$745
½-Ton Truck . . .	\$395
<small>(Chassis Only)</small>	
1-Ton Truck . . .	\$495
<small>(Chassis Only)</small>	

All Prices f. o. b. Flint, Michigan
Balloon tires now standard on all models.

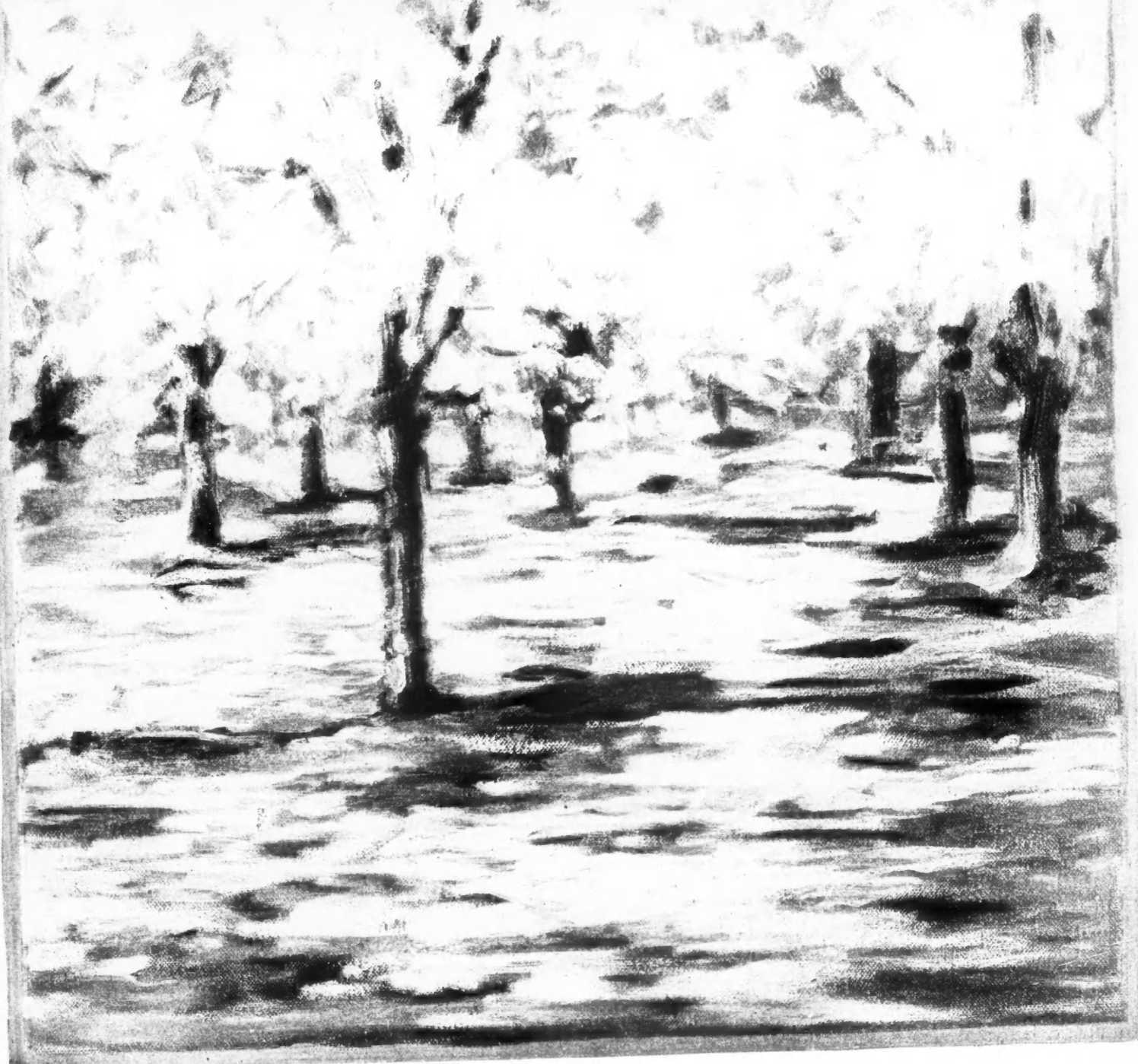
In addition to these low prices, Chevrolet's delivered prices include the lowest handling and financing charges available

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

Q U A L I T Y A T L O W C O S T

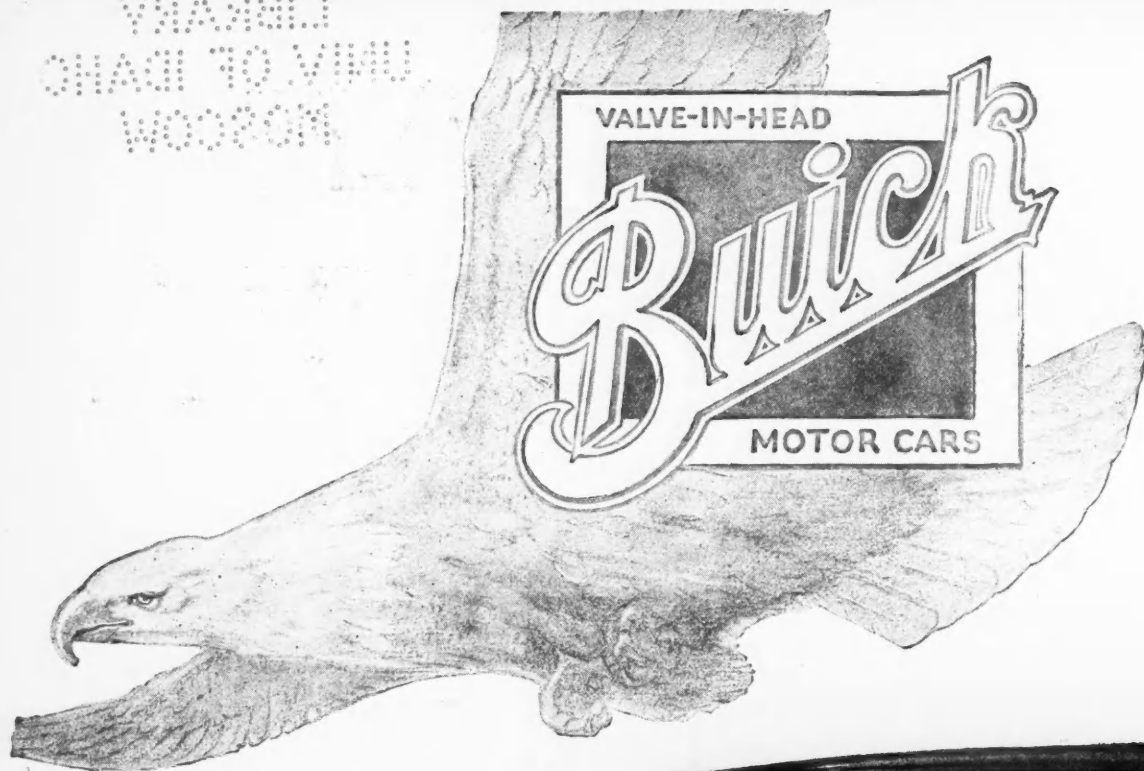
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AMERICAN FRUIT GROWER MAGAZINE



May, 1927
Ten Cents a Copy

VIBRATIONLESS
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WOODS



Vibrationless beyond belief The Supreme Triumph of American Engineering

LUXURY AND COMFORT beyond comparison are now added to Buick performance by the latest achievement of Buick engineers—an engine *vibrationless beyond belief*.

At home and abroad, Buick has long been recognized as an outstandingly fine American motor car.

American boundaries never have confined Buick popularity. All

over the world purchases prove that Buick is the car most people would like to own.

The world thinks well of Buick today because of Buick excellence already demonstrated, Buick value already familiar, and because of that rugged day-to-day dependability—always a characteristic of this famous motor car.

Now Buick has given the world a new reason to pay its tribute to the genius of American engineering—an engine *vibrationless beyond belief*—without question the century's finest contribution to the pleasure of motoring.

BUICK MOTOR COMPANY, FLINT, MICH.

Division of General Motors Corporation

Canadian Factory: McLAUGHLIN-BUICK, Oshawa, Ont.

WHEN BETTER AUTOMOBILES ARE BUILT, BUICK WILL BUILD THEM